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CONTENTS

UDC 632.938.1

Disease-Resistant Varieties of Hard Wheat

18400465 Moscow ZASHCHITA RASTENIY in Russian No 1, Jan 89 p 23

[Article by P. S. Garayev, I. D. Aliyev, and F. Sh. Makhmudov, Senior Scientific Associates at the Azerbaijan Scientific-Research Institute of Agriculture]

[Text] During the period 1983-1986, a total of 512 specimens comprising winter hard wheat in a controlled greenhouse and prospective varieties selected from trial testing were studied at the Shemakhin Regional Experimental Station for their resistance to the most injurious plant diseases common to our area (stem, yellow, and brown rust, stinking smut and kernel smut, and true mildew).

Resistance was evaluated by methods commonly accepted for testing each of the diseases in natural and artificial backgrounds. Growth-stimulating plantings were used in every ten to fifteen plots of the varieties being tested. In addition, ideally susceptible plants were placed around the experimental plots. Conditions conducive to infection were created by means of a late wide-row planting and excessive application of nitrogen.

In order to induce infection with stinking smut and kernel smut, the spore material was collected from different varieties of wheat in the experimental station plantings and partially in the production fields so that the inoculant would contain all the pathogens present in the region and so that it would be possible to avoid errors to some degree in the process of determining the resistance of the tested plants. This enabled us to make a more effective selection of the parent pairs for cross-breeding and for making non-susceptible species.

Most of the varieties in the control nursery and the prospective species selected from competitive trials exhibited a high level of resistance to the pathogens under examination. These specimens were artificially infected with smut diseases. Over the course of four years the same prospective variety was tested six to seven times in natural and artificial backgrounds. This method allowed us to identify the most stable forms.

All of the prospective varieties and types that were resistant to the tested diseases were divided into three groups.

The types that were slightly susceptible to smut diseases included the varieties Leukurum (numbers 0676/7, 0366/1-1-26, 0809/4-1-1, 0797/3-3), Apulikum (0206/7-1-17), Leukomelan (0455/2-44), Erythromelan (0312/3-20-6. 0736/2-63), Melanopus (0610/1-5-1), Gordeiforme (0601/7, 0360/1-29), and Apulikum (0147ª/2-5). Their rate of kernel smut and stinking smut infection was no higher than 1-1.5%.

The species Leukomelan (0366/2-1-15, 0312/2-14-8), Erythromelan (090/2-5, 081/3-4), and Leukurum (0676/7) were resistant to species of rust and the true mildew. Most often, those diseases developed at a rate of five to ten percent, and very rarely did it reach 15 percent, in isolated specimens.

Warranting special interest are those varieties which exhibited comprehensive resistance to all types of rust, smut, and true mildew: Gordeiforme (0206/7, 0206/5), Leukurum (081/30-1-7), and Leukomelan (0312-2-30-6). Those varieties underwent a series of competitive trial selection tests over a period of three to four years and were distinct from the remaining varieties both with respect to resistance to disease and with respect to yield.

The prospective variety Gordeiforme (0206/7) under the name of Shirvan 5 was submitted to the State Committee for the Quality Testing of Agricultural Crops. Its average yield over a four-year period was 33.2 quintals/hectare (and 44 quintals/hectare in some years). The yield of the Shark variety (standard) is 30.4 quintals/hectare.

The prospective varieties Apulikum (0147a/2-5), Melanopus (0366/3-1-26), and Leukurum (081/30-1-7) yielded harvests at 2.6 to 4.1 quintals/hectare more than the standard and are now being reproduced.

The identified resistant and high-yield prospective varieties will undergo secondary breeding and some will be submitted to the State Commission for introduction into specific regions.

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UDC 632.914:633.11:582.285.2

Equations for Prediction of Primary Wheat Stem Rust Infection Based on Readings From Spore Trapping Equipment

18400413 Leningrad MIKOLOGIYA I FITOPATOLOGIYA in Russian Vol 22 No 6, Nov-Dec 88 (manuscript received 24 May 86) pp 561-568

[Article by A. D. Kashirkin, S. S. Sanin and N. M. Rudakova, All-Union Scientific Research Institute of Phytopathology]

[Abstract] The goal of this study was to develop new equations for prediction of plant infections from early concentrations of infectious particles over the fields. Specifically, the early stage of the disease, the infection period was investigated: from the moment of the appearance of air inoculum over clean plants to the completion of the second urediogeneration of fungi. Special field studies were carried out for this purpose at the All-Union Scientific Research Institute of Phytopathology using susceptive sorts of spring and winter wheat during the 1979-1982 period. To determine the number of urediospores, the PLS-71 and PLS-71M instruments were used.

An 8-day incubation period was established experimentally. The work of Eversmeyer on prediction equations for wheat stem rust was used as the basis for formulas that are promising in terms of predicting primary infection but need refinements that allow for weather factors. Figures 2; references 10:5 Russian, 5 Western.

UDC 541.69:577.152:547.26'118

Comparative Studies on Interactions of Human Erythrocytic and Housefly Head Acetycholinesterases With Phosphorylated Alkylchloroformoximes

18400414 Leningrad ZHURNAL EVOLYUTSIONNOY BIOKHIMII I FIZIOLOGII in Russian Vol 24 No 6, Nov-Dec 88 (manuscript received 4 Dec 87) pp 791-795

[Article by G.A. Shatayeva, G.F. Makhayeva, V.L. Yankovskaya, V.B. Sokolov, A.N. Ivanov and I.V. Martynov, Institute of Physiologically Active Substances, USSR Academy of Sciences, Chernogolovka]

[Abstract] A comparative study was conducted on the kinetics of interaction of four 0-phosphorylated alkylchloroformoxime analogs of the insectoacaricide valexon with acetylcholinesterase preparations derived from human erythrocytes (AChE-H) and the heads of houseflies (ACh-F). Determinations of the bimolecular rate constants demonstrated that the activities were predicated on both the structure of organophosphorus compound and on the enzyme, demonstrating thereby that the active surface sites of AChE-H and AChE-F are different. Introduction of one or two Cl atoms into the alkylchloroformoxime group subject to hydrolytic removal increased the degree of inhibition of both the mammalian and the insect enzymes. Diethyl derivatives of the phosphorylated alkylchloroformoximes, where the alkyl radical was varied, showed virtually constant k_{ii} values for AChE-H. Furthermore, the activities were more pronounced on AChE-F than for AChE-H. Maximum differences for the two classes of enzymes were seen with the Me-Derivatives, and less so with the Et-derivatives. The Pr-derivatives were essentially equally inhibitory for AChE-H and AChE-F. Figures 2; references 13: 8 Russian, 5 Western.

Biotechnology Applications Viewed by VASKhNIL Academics

18240229 Moscow SELSKAYA ZHIZN in Russian 1 Aug 89 p 2

[Article by V. Shevelukha and L. Ernst, academicians, VASKhNIL]

[Text] **Biotechnology is today making it possible to solve complicated problems of science and agroindustrial production. A great deal of attention is being paid to its accelerated development in many countries of the world. The article below tells about the status and prospects for use of its advances in our country.**

In certain stages of its development, basic science achieves such qualitative changes that powerful breakthroughs into practice are inevitable. At the same time, a fundamentally new methodological level of thinking is shaped, the base is laid for a revolutionary restructuring in the organization of production and its technology. That is what has happened with the most recent directions in biotechnology, which today is authoritatively invading all fields of knowledge, the economy, and commerce.

The need to use the advances of contemporary biology is immense. It is dictated by the state of affairs created in agricultural production, by the acute need to solve the food problem in the USSR more rapidly. The unstable course of development of the APK is advancing as a strategic problem of science the need to intensify production and increase its stability, to reduce considerably the impact on it from frequently recurring droughts and other adverse environmental factors, to guarantee a sharp reduction in the loss of the harvest in all stages of production, storage, and processing. And one of the decisive factors in that effort is to create fundamentally new plant varieties and hybrids, new animal breeds, new strains of microorganisms possessing higher stability to the stress phenomena of the environment and capable of yielding output even under those conditions.

Today, this task is mainly being solved by the methods of traditional selection. The achievements of selectionists, especially with respect to creating biological entities with high potential productivity, have been quite important and are widely known. Many present-day domestic varieties and hybrids have a potential of 100 quintals per hectare or more for grain crops, 800-1,000 quintals for potatoes and sugar beets, 8,000-10,000 kg of milk per year for the best breeds of dairy cattle, and selected strains of microorganisms are capable of accumulating as much as 60-100 kg of biological nitrogen per hectare planted in a single season.

The world-class achievements of the selectionists V.S. Pustovoyt, P.P. Lukyanenko, V.N. Remeslo, B.P. Sokolov, A.P. Shekhurdin, and V.N. Mamontova are today being supplemented by the important results of scientists who are hard at work—I.G. Kalinenko, D.A. Dolgushin, Yu.M. Puchkov, S.F. Lyfenko, E.D. Nettevich, S.I. Grib, N.A. Rodina, V.N. Musich, and S.P. Zykin. But very little advantage is being taken of the high potential productivity of the new plants, animals, and microorganisms. The reason for this lies not only in shortcomings in the organization of agricultural production and departures from the technological discipline on farms, but also the poor genetic stability of the biological entities. That is why reconstruction of varieties and hybrids of agricultural crops, animal breeds, and strains of microorganisms is an important task of contemporary science, above all of genetics and selection.

The problems are especially acute in creating varieties of wheat, barley, corn, sunflowers, cotton, feed crops, fruits, vegetables, and other crops that will be stable to drought, diseases, and pests. Use of the present-day methods of biotechnology, genetic engineering, and cell engineering may have new potential for creating stable biological entities. Without overestimating their role, without setting them up against the traditional methods of selection, but in combination with them, it is possible, as shown by world and domestic experience, to greatly speed up the performance of this task and even in the next several years to achieve notable results.

Molecular and general genetics, the patterns of genetic transformations discovered by science, that is, changes in the heredity of organisms through deliberate transfer of allogenic genetic material into the cells of plants, animals, and microorganisms and also through artificially guided mutations, are the theoretical basis for developing the new biotechnological methods used in selection. Biotechnology laboratories of the country's selection centers are receiving new initial material of wheat, barley, potatoes, alfalfa, clover, sunflowers, and rape which is distinguished by high stability to drought, soil salinity and acidity, and dangerous diseases and pests. For instance, the barley variety "Odessa 115," which is highly productive and resistant to drought was obtained for the first time by the methods of biotechnology in the All-Union Selection Genetics Institute and regionalized in 13 oblasts of the country in a third of the time that traditional selection takes; the All-Union Rice Scientific Research Institute developed a rice variety "Biorice," distinguished by a high-quality kernel, which is stable to salinity and diseases. New resistant forms and varieties of potatoes, spring wheat, clover, alfalfa, and other crops obtained by the same methods and equal in productivity to the best regionalized varieties are now being tested.

New opportunities are opening up for selection. Specialized biotechnology laboratories have been created to take advantage of them, 14 interdepartmental biotechnology centers have been organized, within them the leading institutes and teaching institutions of the USSR Academy of Sciences, VASKhNIL, and the USSR State Committee for Public Education. They include the Timiryazevskiy, Moscow, Leningrad, Ukrainian, Novosibirsk, Tselinograd, Kazakh, Estonian, and other centers where manpower and resources are concentrated

to solve the problems of biotechnology. But they are in need of improved physical facilities and equipment. VASKhNIL has been taking the necessary steps in that direction. Unfortunately, the USSR Academy of Sciences, the USSR State Committee for Public Education, and councils of ministers of union republics have not been showing the concern they should for financing and building the physical facilities of institutes and universities which are incorporated in those centers. This applies above all to the Novosibirsk, Leningrad, and Kazakhstan biocenters.

A project was designed in the Timiryazevskiy Biocenter and is now being carried out to create a transgenetic potato with combined resistance to the Colorado potato beetle as well as viral, bacterial, and fungal diseases. Projects are under way in the Ukrainian Biocenter to create the initial material of grain crops and potatoes and to improve the methods of biotechnology, in the Tselinograd center there are projects to treat plants against viruses and to create a new form of spring wheat resistant to drought and salinity. Today, institutes of the potato industry of the RSFSR, Belorussia, and the Ukraine, joined by scientific institutions of Estonia, have organized the production of virus-free potatoes in a volume of 110,000 tons per year, which is 8 percent of the country's total need for it. The use of seed potatoes that have been freed of the virus guaranteed a minimum increase of 15-20 percent in the yield.

But, unfortunately, agricultural authorities and the managers and specialists of many farms are not sticking to the technologies for raising potatoes recommended by science, and as a consequence the effectiveness of virus-free raising of the seed potatoes is greatly reduced. This attitude toward the use of new scientific developments will be all the more intolerable when new virus-resistant varieties of potatoes and other crops come to replace the old ones in the next few years. In practically all republics and oblasts, it is possible over the next 2 or 3 years to create agrofirms for raising virus-free seed potatoes and making the complete transition to planting only these potatoes.

In the Ukraine, for example, the scientific-production system "Bioklon" is already in operation (head enterprise—UkrNIIKKh). Its task is to test and debug the 3-year scheme for production of the elite potato on the basis of the technology of microcloning the virus-free material. Biotechnology shops have been created in 24 agricultural enterprises (kolkhozes, sovkhozes, agrofirms, and agricultural institutes), and they are part of the scientific-production system "Bioklon."

The achievements of the All-Union Selection Genetics Institute and of the All-Union Institute of Cropping imeni N.I. Vavilov in the study of protein markers have made it possible to introduce fundamentally new methods of evaluating the seed of agricultural crops and to determine its origin. They are widely used by the international organization ISTA even in the USSR.

The methods of biotechnology are today producing new ecologically clean preparations for cropping. Among those with the greatest economic importance are regulators of plant growth and development and biopesticides. Natural regulators after the pattern of the auxins, cytoquinines (tsitokininy), gibberellins, abscissic acid, fuzikoktsin, as well as new synthetic preparations which are analogous in nature are making it possible to increase the resistance of crops and plantings of agricultural crops to drought and other stress factors of the environment, to regulate growth, ripening periods, and the bearing of plants, and to improve the quality of the product. Favorable results have been obtained from the use of kartolin and certain other preparations on plantings of grain crops on farms of Belorussia and a number of oblasts in RSFSR. But the scale of application of such preparations and also biopreparations of nitrogen-fixing microorganisms in agriculture is still negligible.

Unfortunately, projects to create new microbiological preparations to protect crops from pests and diseases are lagging far behind. Only four domestic preparations are being used in production today, and even then on an extremely limited scale. Very great attention is being paid to this problem abroad. The reason is the large economic benefit from applying biopesticides, the possibility of sharply reducing the volume of application of chemicals for plant pest and disease control. The USSR Academy of Sciences and the USSR Ministry of Medical Industry possess the necessary scientific potential to quickly overcome the lag in developing research and creating a broad spectrum of biopesticides for agriculture. The efforts of institutes of VASKhNIL are also aimed in that direction.

In animal husbandry, contemporary biotechnological methods have made it possible to advance the work of transplanting embryos and zygotes to obtain highly productive animals, to create transgenetic individuals with increased resistance to dangerous diseases, to obtain and use growth hormones to increase the productivity of livestock.

In scientific institutions and breeding farms, there are 34 specialized centers and 126 stations for transplantation of embryos, and more than 5 million calves have been obtained using this method. Paramount importance is being paid to this important effort. Genetic engineering methods have derived strains of microorganisms producing certain irreplaceable amino acids. Basic scientific projects are being carried out to create strains of microorganisms producing animal growth hormones whose use in animal husbandry, other things being equal, will increase the daily weight gain of livestock and the milk production of dairy cows by 10-15 percent. Other projects of economic importance are those to create strains of microorganisms that intensify processes in the digestive tract of animals in order to improve feed utilization. New microbiological preparations are being created for the preservation of animal feed, for improvement of its preservation during storage. All of these

projects are being conducted in close contact with scientists of VASKhNIL by researchers of the USSR Academy of Sciences and the USSR Ministry of Medical Industry. The principal projects in biotechnology in animal husbandry have been organized in the All-Union Scientific Research Institute for Animal Husbandry, the All-Union Scientific Research Institute for Animal Breeding and Genetics, by the All-Union Scientific Research Institute for Agricultural Biotechnology. But they have to greatly broaden the scale and the application of their developments in production.

It is of particular interest to practice to create transgenetic animals, i.e., individuals with allogenic genes ensuring an increase in their productivity and resistance to diseases. Genetic engineering methods have been developed that make it possible to perform gene operations on zygotes of swine, sheep, rabbits, and other animals, and transgenetic animals have been obtained with useful characteristics. A method has also been developed and applied for surgical division of embryo making it possible to multiply the number of progeny from particularly valuable animals. There have been essential advances of biotechnology in veterinary science. The production of immunoenzymatic diagnosticums of infectious animal diseases using the methods of cellular and genetic engineering has made it possible to solve successfully the very complicated important problem of diagnosis, treatment, and prevention of foot-and-mouth disease and rhinotracheitis and to find new approaches to developing methods of diagnosing leukoses and other dangerous diseases.

The immunoenzymatic diagnosis that is in use is one of the most promising methods of discovering viral, bacterial, protozoan, and other infections of agricultural animals. Such diagnosticums have been created today for many diseases as well as for detection of toxins, hormones, immunoglobulins of various classes, etc. Monoclonal antibodies have been obtained to stomatoviral enteritis of calves, gastroenteritis of swine, to the virus of cattle leukosis, and research is under way to develop immunoenzymatic analysis for diagnosis of cattle brucellosis. Systems for microbiological synthesis of diagnostic and preventive preparations against many diseases of agricultural animals are being created by the methods of genetic engineering in the All-Union Institute of Experimental Veterinary Medicine (Moscow). The achievements of biotechnology in the field of veterinary science are the most significant today. But even today what has been achieved should not be overestimated. Essentially, the work has just begun.

In the processing and food industries, biotechnology is being used today to produce enzymes, amino acids, feed and food proteins, therapeutic, preventive, and dietitic foodstuffs, various antibiotics, and feed additives (premixes). Membrane technologies are also being used for ultrafiltration and fine purification as well as to create new types of foodstuffs. The need for them is increasing sharply. Biogas, obtained by processing organic waste using biogas installations, is a relatively inexpensive source of energy in agriculture. These installations have been built and are in operation in Estonia, a number of oblasts of RSFSR, and in other republics.

Our country's institutes are not lagging behind the best foreign scientific institutes in the level of research and the quality of developments in the field of cellular and tissue biotechnology. But in terms of the scale of their application in agroindustrial production and other sectors of the economy we are lagging considerably behind the advanced capitalist countries, large and small. The efforts of scientists of the USSR Academy of Sciences and VASKhNIL are now being united to work along the priority lines of genetics and biotechnology, and toward application of their advances to production. Leading scientists of the USSR Academy of Sciences—G.P. Georgiyev and K.G. Skryabin of the Molecular Biology Institute, R.G. Butenko of the Plant Physiology Institute, I.G. Atabekov (Moscow State University), E.S. Piruzyan of the Molecular Genetics Institute, Yu.Yu. Gleba (Botany Institute of the USSR Academy of Sciences), and N.G. Debabov of the Institute for the Genetics of Industrial Microorganisms of USSR Minmedbioprom—are carrying on very important development projects in cellular and genetic engineering in close interaction with VASKhNIL scientists. Joint research with scientists of the socialist countries has also been organized under the Comprehensive Program for Scientific-Technical Progress of the CEMA Member Countries up to the Year 2000, whereby manpower is concentrated on priority target projects that have been worked out jointly.

Given the growing importance of the new directions in biology, one of the leading institutes of VASKhNIL—the All-Union Scientific Research Institute for Agricultural Biotechnology—has been given responsibility to function as the head organization on this problem. Jointly with scientists of Hungary, GDR, Bulgaria, Cuba, Mongolia, Poland, Vietnam, Romania, and Czechoslovakia three priority target projects concerning biotechnology in agroindustrial production are being carried out: "Virus-Free Cropping," "Bionitrogen," and "Foot-and-Mouth Disease." In the Soviet-Czechoslovak-Polish and Soviet-Bulgarian joint biotechnological laboratories, methods are being refined for transplantation of animal embryos, and research is being done on application of the methods of genetic engineering in animal husbandry.

According to the forecasts of leading scientists, by the year 2000 biotechnological products will have a share of 20-25 percent of the total volume of world trade of the APK and medicine. In the world's best laboratories, forms of agricultural plants resistant to the effect of herbicides, pests, diseases, and soil salinity have already been created. The seed of commercial varieties with these characteristics will soon go on the world market. The production and sale of physiologically active substances for animal husbandry are growing. Taking all this into account, a majority of the countries of the world have drafted and are carrying out national programs and projects to use biotechnology in medicine, agriculture, and the processing industry, allocating very large

resources for this purpose. Biotechnological centers and laboratories are carrying on research at a leading pace in the United States, Japan, West Germany, Great Britain, Canada, Australia, the Netherlands, Italy, and France, and China, India, and other developing countries are becoming actively involved in solving national biotechnological problems.

The strengthening of scientific-technical ties with all the leading countries in the field of biotechnology will be a pledge to its development. But it is equally important for the public and the state to support science along that road.

UDC 576.8(631.862:636.4)

Experience in the Operation of a Semiindustrial Biogas Installation

18400397c Riga IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR in Russian No 12, Dec 88 (manuscript submitted 20 Jun 88) pp 90-93

[Article by V. E. Davids, A. A. Upit, A. P. Grinberg, Yu. Ya. Gaylums, Ya. Ya. Valters, and M. Ye. Beker, Institute of Microbiology imeni Avgust Kirkhenshteyn, LaSSR Academy of Sciences]

[Abstract] A by-product of the process for producing green protein concentrate by way of fractionating the green mass of plants after thermal coagulation is a protein-free fraction called brown sap. Because the sugars in the sap are quickly converted into organic acids and pH falls to 5 or lower, the sap cannot be used as a fertilizer in Latvia's acidic soils. One alternative for the the sap is its anaerobic methane fermentation with a fermented substrate for irrigation, or its purification to a level that will enable it to be discharged into water reservoirs. Anaerobic processes are more economical than aerobic processes for converting organic matter into biogas. A semiindustrial installation was constructed at an experimental station of the Institute of Microbiology imeni Kirkhenshteyn at the Uzvara agricultural firm in the Bauskiy Rayon in 1985. The installation consists of an accumulator for fresh substrate, a system for heating the brown sap, a bioreactor, and a system for purifying, accounting for, and using the biogas. Three years of operation enabled the following conclusions: (1) the bioreactor works reliably with as much as 6.5% replacement of sap per day; (2) the substrate that is produced has a weakly alkaline reaction (pH 7.2-7.5), which means it can be used as irrigation fertilizer and it does not acidify the soil; (3) the biogas yield is 0.8-2.4 m^3 from 1 $m^3$of bioreactor hydraulic volume when 1-4 m^3 brown sap is loaded per day; (4) methane production averages 1 m^3/kg decomposed organic matter; (5) sectioning must be used in horizontal reactors; and (6) the principal portion of the energy of the biogas that is produced is used to maintain the temperature regime of the process, and the remainder is used to produce electrical power and heat energy. Figures 1, references 7: 4 Russian, 3 western.

UDC 616.756.26:616-006.442/.443

Axillary Lymphogranulomatosis: Case Study

Kiev VRACHEBNOYE DELO in Russian No 1, Jan 89 (manuscript received 2 Sep 87) pp 71-72

[Article by O. V. Blinova and V. V. Doskuch, Pulmonary Tuberculosis and Accompanying Diseases Clinic, Kiev Scientific Research Institute of Tuberculosis and Pulmonology imeni F. G. Yanovskiy]

[Abstract] A case study is presented of a 25-year-old male from southern Africa followed for 2.5 months because of axillary lymphadenitis, from which the patient had suffered for six years. Extensive clinical workup and biopsy materials in conjunction with hepatomegaly, splenomegaly, and enlarged kidneys led to initial diagnosis of tuberculosis, which was subsequently replaced by a diagnosis of tropical granuloma. However, appropriate therapeutic modalities proved to be ineffective. The failure of therapy and further consultation led to diagnosis of axillary lymphogranulomatosis, which responded to doxycycline. The patient was discharged in a satisfactory state after 3 weeks on the antibiotic.

UDC 612.017:578.828]-078.7:312(476)

Detection of HIV Infection and AIDS in Belorussia

18402010b Minsk ZDRAVOOKHRANENIYE BELORUSSII in Russian No 1, Jan 89 (manuscript received 29 Apr 88) pp 60-61

[Article by P. G. Rytik, N. D. Kolomiyets, I. V. Malakhova, V. P. Luchko, V. V. Krishchanovich, and V. N. Buryak, Belorussian Scientific Research Institute of Epidemiology and Microbiology]

[Abstract] Immunoassay studies were conducted 30,612 individuals in Belorussia, both natives and citizens of other countries, to assess the status of HIV infection. The enzyme immunoassays revealed that 167 (0.54%) of the subjects tested positive, with 53 of the positives coming from the 7852 foreigners residing in Belorussia. In 21 cases, confirmatory data for HIV infection were obtained by immunoblotting. The presence of HIV infection in Belorussia poses a new challenge to the public health authorities in terms of education and active preventive measures to control the spread of AIDS. References 5: 1 Russian, 4 Western.

UDC 616.831-002-022.7:578.833.26]-022.39-036.1(470.23)

Tick-Borne Encephalitis (TBE) in Leningrad Oblast

18402012b Moscow SOVETSKAYA MEDITSINA in Russian No 1, Jan 89 (manuscript received 29 Dec 87) pp 83-85

[Article by V. K. Prigozhina, I. A. Semenova, and I. M. Manoim, Chair of Infectious Diseases, Leningrad Institute for Advanced Training of Physicians; No 30 Municipal Infectious Hospital]

[Abstract] An analysis was conducted on 314 case histories of TBE in the Leningrad Oblast. The majority of the cases were contracted as a result of occupational or recreational visits to forest areas. Most of the patients in the period in question (1975-1986) were 20 to 60 years old (78.1%) and were men (62.1%). Most cases occurred in the summer, peaking in June (33.4%). In 82.5% of the cases, tick bites were implicated; an incubation period of 2-63 days followed. Consumption of raw goat milk was implicated in ten patients (3.2%). In the majority of the patients (89.5%), the disease began suddenly; fever reached 38-39°C or higher in 84.2% of the cases. However, 15.8% of the cases were subfebrile. The duration of the febrile state lasted from one to 25 days, with a mean of 13.5 days. In the Leningrad Oblast, TBE was manifested largely in the meningeal form and was classified as moderate in 66.2% of the patients and as severe in 23.9% of the cases. References 7 (Russian).

Zoonotic Aspects of Cutaneous Leishmaniasis in Chimkent Oblast

18402013b Alma-Ata ZDRAVOOKHRANENIYE KAZAKHSTANA in Russian No 1, Jan 89 pp 45-46

[Article by K. B. Dzhumagulov, L. P. Rapoport, L. N. Yeliskeyev, B. K. Torgautov, and S. K. Nyshanov, Chimkent Oblast Sanitary Epidemiologic Station; Antiplague Station; Institute of Medical Parasitology and Tropical Medicine imeni Martsinovskiy, USSR Ministry of Health]

[Abstract] An assessment was conducted on the status of risk factors in cutaneous leishmaniasis in Chimkent Oblast, through an analysis of infected gerbils and mosquito vector in the Eastern Kyzylkum (1975-1981) and the irrigated lefthank area of Syrdaryn River (1983-1987). In the Eastern Kyzylkum the percentage of infected gerbils stood at 25%, with the burrow infested predominantly with Ph. andrejevi and Ph. caucasicus mosquitoes. However, Ph. papatasi represented the most aggressive species. In the settled areas around Syrdaryn River more than 90% of the captured mosquitoes were represented by Ph. papatasi, and almost 100% of the

gerbils in the Syrdaryn region were found to be infected. These factors combined to foster a steady increase in the incidence of cutaneous leishmaniasis in that area, starting with 83 cases in 1984 and rising to 1277 cases in 1987, for a total five year case load of 2075 patients. Extensive efforts at eradication of the gerbils and mosquito control have been relatively ineffective due to influx of gerbils from the Kyzylkum desert. Accordingly, the prognosis for the incidence of cutaneous leishmaniasis in the Chimkent Oblast is not favorable. References 1 (Russian).

Temporary Immunodeficiency Due to Extreme Physical and Emotional Stress

18402011a Moscow TEORIYA I PRAKTIKA FIZICHESKOY KULTURY in Russian No 2, 1989 pp 4-7

[Article by R. S. Suzdalnitskiy, doctor of medical sciences, V. A. Levando, B. B. Pershin, and S. N. Kuzmin, Central Scientific Research Institute of Biomedical Problems in Sports; Central Scientific Research Institute of Vaccines and Sera imeni I. M. Mechnikov, USSR Ministry of Health]

[Abstract] A brief review is presented of the problem of immunodeficiency arising from extreme physical and emotional stress of the type common to many sports activities. Clinical evidence has been compiled which indicates that the incidence of morbidity increases 10- to 25-fold in athletes prior to and during a meet, a time of tremendous physical exertion and mental stress. This form of temporary immunodeficiency has been differentiated into four stages, consisting of activation, compensation, decompensation, and recovery of the immune system. At its height, both the cellular and humoral aspects of immunity are seriously depressed. Titers of immunoglobulins and defined antibodies may fall to zero, a finding designated as the "antibody and immunoglobulin disappearance phenomenon." The general term that has been coined to cover this form of secondary immunodeficiency is "paralysis of the immune system," at least in the Soviet literature. It is generally agreed that the pathogenetic mechanisms underlying this form of secondary immunodeficiency involve stress-related imbalances in the neuroendocrine feedback mechanisms and metabolic disturbances due to depletion of essential nutrient factors. Figures 2; references 10 (Russian).

UDC 616-006.6-097

Morphological Changes Produced by Viral Immunomodulator in Human Osteosarcoma Cell Culture

18400397a Riga IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR in Russian No 12, Dec 88 (manuscript submitted 18 Aug 88) pp 69-71

[Article by G. A. Grigalinovich and R. G. Petrovska, Institute of Microbiology imeni Avgust Kirkhenshteyn, LaSSR Academy of Sciences]

[Abstract] A viral immunomodulator developed under the direction of A. Ya. Mutseniyetse at the laboratory for viral therapy of cancer of the Latvian Academy of Sciences Institute of Microbiology imeni Kirkhenshteyn has been found effective in a combined treatment regime for melanoma of the skin. The preparation is a specially selected apathogenic virus adapted to human melanoma cells. The absence of toxicity and side effects has prompted a search for similar preparations to be used in the treatment of other malignant cancers. The authors studied the effects of the viral immunomodulator on *in vitro* osteosarcoma cells with an eye to developing a preparation effective against human sarcoma. The cells were placed in contact with the immunomodulator for 30 minutes, as well as 1, 3, 6, 12, and 24 hours. After six hours, the morphological picture exhibited a pronounced cytopathic effect that led to the destruction of the tumor cells. Mitotic activity was suppressed; pathological mitoses were visible. The clearest manifestations of the preparation on the osteosarcoma cells were seen after 24 hours: unlike in the control culture—which had a full monolayer with a well-expressed morphology of cells and distinct cell membranes, nuclei, nucleoli, and normal mitoses—the experimental culture was completely destroyed. A human ECHO enterovirus was used in the experiment. The effect of viral infection on the disturbance of the mitotic activity of the cells was regarded as a manifestation of cytopathic effect. The penetration of the immunomodulator into the cell resulted in the freeing of lysosome enzymes that lead to destruction of the tumor cells. The authors feel that the preparation should be developed for clinical use. Figures 6, references 1 (Russian).

UDC 616-006.04

Effect of Viral Immunomodulator on Morphology of Melanoma of the Skin and on Patient Survival Rate

18400397b Riga IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR in Russian No 12, Dec 88 (manuscript submitted 18 Aug 88) pp 72-75

[Article by G. A. Grigalinovich, M. F. Rudzitis, M. P. Skudra, B. A. Popena, I. P. Desyatnikova, and R. R. Garklava, Institute of Microbiology imeni Avgust Kirkhenshteyn, LaSSR Academy of Sciences]

[Abstract] With the ever increasing number of skin cancer patients throughout the world and the inadequacy of conventional methods of treatment, the use of immunotherapy is growing in the clinic. A new viral immunomodulator called Rivir, developed by A. Ya. Mutseniyetse at the Latvian Academy of Sciences Institute of Microbiology imeni Kirkhenshteyn, has undergone clinical testing for use against melanoma of the skin along with other immunomodulators. The authors present data involving the five-year survival rate among 238 postsurgical skin-melanoma patients treated with Rivir on an outpatient basis at three facilities in Latvia. The results of morphological studies of the surgically removed tumors and lymph nodes of 148 individuals are also made available. The follow-up study indicated that 60.5% of the individuals who received Rivir in the $pT_{1-4}N_1$ stage survived five years, as opposed to 21.4% of those who receive other forms of treatment. Individuals with melanoma of the skin on the lower extremities showed the highest five-year survival rate at 80.9% (versus 42.5% for those administered other preparations). The clinical and morphological studies enabled the following preliminary conclusions: (1) Rivir has a

pronounced effect against melanoma by affecting immunocompetent cells and leading to the destruction and necrosis of the tumor; (2) lymphoid infiltration of the tumor area is a factor that promotes the positive effects of Rivir; (3) the presence of m_tastases in removed regional lymph nodes serves as an indication for the use of the immunomodulator; and (4) in long-term use of the preparation, the regional principle of its administration with regard to tumor focus should be adhered to. Figures 5, references 8 (Russian).

UDC 617.7-085.849.19.001.24

Assessing Degree of Risk of Transscleral Laser Coagulation

18400481 Odessa OFTALMOLOGICHESKIY ZHURNAL in Russian No 8, 1988 pp 470-473

[Article by L. A. Linnik, professor, A. P. Privalov, senior engineer, P. P. Chechin, candidate of medical sciences, G. I. Zheltov, candidate of physical and mathematical sciences, Yu. L. Tverskoy, candidate of technical sciences, and V. N. Glazkov, junior scientific associate, Odessa Order of the Red Banner of Labor Eye Diseases and Tissue Therapy Scientific Research Institute imeni Academician V. P. Filatov]

[Text] Using laser transscleral methods with certain pathological eye conditions is more effective than using transpupillary methods of laser therapy.[2,3,6]

Using transpupillary laser coagulation methods for opacification of the refracting media of the eye, rigid pupils, and oral-equatorial localization of the pathologic process is virtually impossible.

Using laser transscleral methods that do not depend on the condition of the eye's refractive medium or the site of the pathologic process makes it possible to expand the sphere of use of laser radiation in ophthalmology practice.

With the development of new methods based on using high-power laser radiation comes the need to assess the degree of risk of their use. A number of undesirable phenomena associated with the nature of the interaction of laser radiation with the sclera have been discovered during the clinical use of transscleral methods. These phenomena increase the hazard of using the method and limit the possibility of its practical use in ophthalmology.[1,3]

It is known that transscleral coagulation is most effective in the near-infrared wavelength range. It is also possible, however, to use radiation in the visible region of the spectrum that is intensively absorbed by the vascular membrane and pigmented epithelium.[2,3] The coagulation effect depends on the following parameters of laser radiation: wavelength, pulse duration, and power and diameter of the laser beam in the zone of the action.

If, during action on tissue, the radiation spectrum and pulse duration remain constant, the power of the laser radiation and its spatial distribution on the inner and outer surfaces of the sclera will undergo significant changes.

During transscleral coagulation methods, the radiating power acting on the eye's structure may be represented in the form of the following components[7,8]:

$$E_0 = E_r + E_{sf} + E_{sb} + E_c, \quad (1)$$

where E_0 is the power of the active radiation; E_{sf} and E_{sb} are, respectively, the power of the radiation scattered forward and backward; E_r is the power of the radiation that is mirrored on the surface of the sclera; and E_c is the power of the radiation passing directly through the sclera without scattering.

The quantities E_r and E_{sb} constitute the maximum radiation losses during interaction with the sclera and represent a fundamental hazard for medical personnel.

The radiating power E_r mirrored from the air-conjunctive tissue interface is calculated by Fresnel formulas. In the cases of a normal incidence, $E_r = 0.03 E_0$. When the angle at which the radiation enters the sclera is changed, the value of E_r increases.

The reflection from a sclera with a radius of curvature $R_{sc} = 11$ mm gives the laser beam new spatial parameters.[1] For example, when a gaussian beam of a ruby laser is used ($\lambda = 0.69$ μm, $r = 1.5$ mm, $\tau_{pulse} = 0.5 \times 10^{-3}$ s, $= 5 \times 10^{-3}$ rad, $E = 1.0$ J), the reflected radiation has a spread on the order of 0.27 rad. The radius of the laser beam in the plane of the observer at a distance of 250 mm amounts to $r_1 = 69$ mm.

When the reflected radiation is observed along the beam axis, i.e., the "worst-case scenario," the energy exposure $H_{cornea} = 2.0 \times 10^{-4}$ J/cm^2, which is far below the maximum allowable level for the specified conditions. It is, however, possible for a laser spot with the radius $r_{retina} = r_{retina\ min.} = 5$ μm[1,5,12] to form on the fundus of the physician performing the transscleral procedure when his eye accommodates itself to the focus of the spherical surface of the sclera, near where the narrowing of the laser beam occurs. Allowing for the screening of the radiation by the pupil and the transmission coefficient of the optical media of the eye for a wavelength of 0.69 μm, the radiating power on the retina amounts to 7.6×10^{-5} J, which corresponds to an energy exposure of 97.4 J/cm^2, which is far above the maximum allowable level for the retina under conditions of observation of a point source, i.e., the reflected radiation creates a significant risk for the physician when he is observing the zone of the action.

Focused laser radiation is usually used for transscleral actions. The shaping optical systems make it possible to produce a narrow laser beam 100-300 μm in diameter at a distance of 70-100 mm. In these cases, the curvature of the sclera has a negligible effect on the spread of the reflected radiation, which results in a significant increase in the hazard of observing this radiation.

Strict observance of the angle at which the radiation enters along the normal to the sclera reduces the hazard for medical personnel. In practice, however, it is not possible to hold this angle precisely, which results in the formation of hard-to-monitor laser hazard zones around the zone of the action.

For example, when the focused radiation of a ruby laser ($\lambda = 0.60$ μm, $\tau_{pulse} = 0.5 \times 10^{-3}$ s; $= 0.04$ rad, $E = 1.0$

J) is used, the energy exposure at a distance of 250 mm during observation of reflected radiation along the beam axis amounts to $H_{cornea} = 9 \times 10^{-3}$ J/cm^2, which is about fourfold higher than the maximum allowable level for these irradiation conditions.

The accommodation of the physician's eye to the scleral focus or the narrowing of the reflected radiation may result in the formation on the retina of a laser spot that is close to the diffraction limit, which also increases the risk in observing the zone of action.[1,4,12]

Thus, the Fresnel reflection from the spherical surface of the sclera represents a real hazard for the observer's eye.

All estimates of the energy exposure in the pupil were conducted under conditions in which gaussian beams were used as the most hazardous for the observer.[1,11] An analysis of the hazard represented by the radiation scattered from the sclera is made significantly more complex on account of the absence of reliable data on backscattering. In our view, E_{sb} may be calculated most reliably in accordance with the theoretical and experimental data previously published in two sources.[5,10]

The intensity of the backscattered radiation changes negligibly in the spectral range from 500 to 1,000 μm.[9] For the visible region of the spectrum, nearly 50 percent of the active radiation is backscattered. The spatial distribution of the backscattered radiation is approximately subject to Lambert's law. Figure 1 presents the indicatrixes of the scattered radiation.

Considering the distribution of the radiation, the energy exposure of the scattered radiation of a ruby laser (E = 1.0 J, = 5×10^{-3}rad, r = 1.5 mm, $\tau_{pulse} = 10^{-3}$ s) at a distance of 250 mm from the surface of the sclera and an angle of 45 degrees to the direction of entry of the radiation amounts to $H_{cornea} = 1.77 \times 10^{-4}$ J/cm^2, which is below the maximum allowable level for these conditions, i.e., observation of the scattered radiation may be considered safe.

When the physician's eye accommodates to the scleral focus, the formation of $r_{retina} = 204$ μm is possible. In view of the screening of the radiation by the pupil, the transmission coefficient of the eye media is $H_{retina} = 2.5 \times 10^{-2}$ J/cm^2, which is also below the maximum allowable level for these conditions.

However, when focused laser beams are used, it is possible for laser spots with $r_{retina} = 20$ μm to form on the physician's fundus. The energy exposure on the retina amounts to $H_{retina} = 2.68$ J/cm^2, i.e., observation of the scattered radiation when using focused laser beams is also safe.

The negligible differences between H_{retina} and the maximum allowable level make it possible to conclude that using radiation with minimal focal dimensions in the plane of the sclera and the "worst-case" accommodation conditions may lead to the formation on the physician's

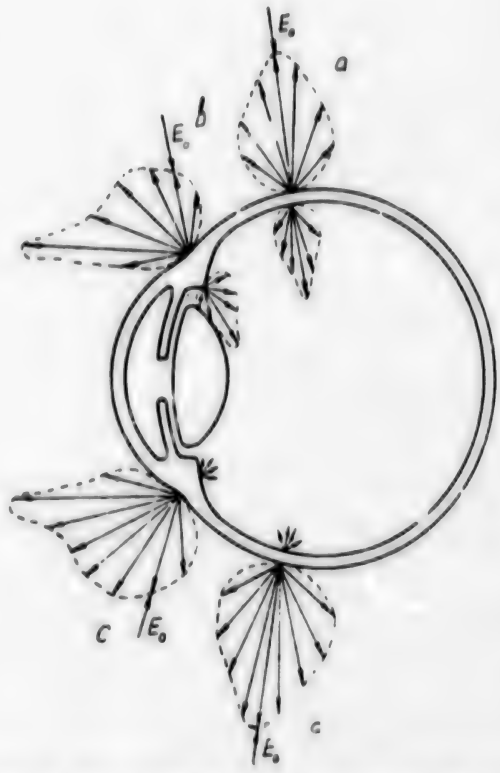

Figure 1. Standard indicatrices of scattered laser radiation with a wavelength of 1.06 m (a, b) and 0.48 m (c, d) at normal (a, d) and arbitrary (b, c) angles of the focused laser beams' entry.

fundus of laser spots approximating $r_{retina} = 5$ μm, which may increase the danger of the appearance of primary biological effects.[1,3]

The possibility of the occurrence of secondary biological effects must be examined for each specific method of laser therapy, and it is entirely obvious that the appearance of secondary biological effects is most likely upon multiple actions (50 to 100 pulses per session).

In addition, the structure of the sclera and its optico-physical parameters results in uncontrollable changes in the spatial and energy characteristics of the radiation passing through it, which increases the risk of the occurrence of undesirable complications.

The result of coagulation depends on the quantities E_{sf} and E_c, which characterize the parameters of the radiation on the inner surface of the sclera. The radiating power that passes directly through the sclera may be estimated on the basis of the scattering coefficient.[9,10] For a wavelength of 0.48 μm, $E_c = 0.03\ E_0$, and for a wavelength of 1.06 μm, $E_c = 0.3\ E_0$, i.e., the radiation in the infrared range is less subject to scattering than is the radiation of the short-wave portion of the visible spectrum.

The intensity of the radiation scattered forward amounts to $E_{sf} = 0.06\ E_0$ for $\lambda = 0.48$ μm, and it amounts to $E_{sf} = 0.18\ E_0$ for $\lambda = 1.06$ μm.[10]

Thus, when an argon laser is used, negligible levels of radiation are formed on the inner surface of the sclera. When radiation in the infrared region of the spectrum is used, the quantity $E_{sf} + E_c$ reaches $0.5\ E_0$, which indicates the high efficiency of the transscleral transmission of radiation.

The indicatrices of the radiation passing through the sclera represent a combination of spatial distributions of the components E_c and E_{sf} (Figure 1). If the forward scattering is subject to Lambert's law, E_c represents a directed laser beam with a specified spread.

In view of the fact that for the infrared region a significant portion of the radiation is directed through the sclera, changing the angle at which the radiation enters results in a change in the total spatial distribution. This causes the production of coagulation foci in the form of an ellipse with an uneven coloration intensity; as a rule, it is bright white on one side and a gray color with fuzzy boundaries on the other side.

Widening the laser beam on the inner surface of the sclera increases the zone of action severalfold (the diameter of the minimum foci amounts to 200 to 300 μm), which results in a marked perifocal edema with a prominence into the vitreous body and damage to the adjacent structures.

It is possible to narrow the indicatrix of the forward-scattered radiation by using focusing; however, the exact selection of the location of the focus is difficult on account of the intensive scattering of the radiation near the target in connection with the movement of the eye.[2,3] Even a small change in the position of the focus results in a significant change not only in the quantities E_c and E_{sf}, but also in the spatial distribution of the radiation, which causes unpredictable coagulation results (the formation of polymorphous coagulation foci from threshold to critical damages and the formation of steam and gas bubbles and hemorrhages at fixed energy exposures).

The absorption characteristics of the pigmented structures of the eye do not provide full absorption of the active radiation. In view of this, it becomes necessary to estimate the parameters of the radiation passing through the sclera, the vascular membrane, the pigmented epithelium, and the vitreous body in order to determine possible damage to the structures of the fundus located on the side opposite the zone of action. The total transmission through the pigmented epithelium and vascular membrane of a person for $\lambda = 0.48$ μm is 7.5 percent. For $\lambda = 1.06$ μm, it is 41 percent. Allowing for the transmission coefficient of the vitreous body, the radiating power (E_T) in the plane of the retina on the opposite side amounts to $E_T = 0.06(E_c + E_{sf})$ for $\lambda = 0.48$ μm and $E_T = 0.31(E_c + E_{sf})$ for $\lambda = 1.06$ μm.

The sclera's considerable attenuation of the radiation in the blue-green region of the spectrum makes it possible to conclude that the danger of damage to the structures of the eye on the opposite side is negligible. Radiation of the near-infrared region creates a real threat of injury since E_T amounts to about 15 percent of E_0. At an energy of action equal to $E_0 = 1.0$ J, E_T amounts to 0.15 J. Considering the Lambert distribution of the radiation, the energy exposure on the opposite side of the retina is on the order of 10^{-2} J/cm^2. The maximum allowable level of the energy exposure of the retina H_{retina} for these conditions is $H_{retina} = 4 \times 10^{-3}$ J/cm^2, i.e., the damage to the structures of the retina on the opposite side of the eyeball is real. Using focused laser beams whose spatial distribution differs from the Lambert distribution increases the risk of undesirable complications even more.

The total forward scattering of radiation forms a zone of maximum intensity in the scleral mass.[10] The spatial position of this maximum depends on the coefficient of attenuation of the radiation by the sclera. If, for radiation with $\lambda = 1.06$ μm, the depth of the maximum is 0.4 to 0.5 mm, then for radiation with $\lambda = 0.48$ μm, the localization of the maximum shifts to the side of the outer surface of the sclera and equals 0.15 mm.

The formation of regions with the maximum scattered radiation causes the so-called "popcorn" effect, which is confirmed by the light crackling occurring at the moment of the transscleral action.

Radiation in the blue-green portion of the spectrum from an argon laser may result in damage to the inner and surface structures of the sclera.

Thus, based on the aforementioned, it is possible to draw the following conclusions:

1. Laser methods of transscleral actions are characterized by significant losses related to the distinctive features of the interaction of laser radiation with the sclera, which requires the use of energy levels exceeding those used in transpupillary laser coagulation.

2. The radiation reflected from the sclera creates a real hazard for medical personnel. Visual observation of the sclera without protective equipment at the moment of transscleral laser coagulation is categorically forbidden.

3. The forward scattering of radiation enlarges the zone of action considerably, causes intensive perifocal changes, creates a risk of injury to the conjunctiva and sclera, and results in the formation of coagulation foci that differ sharply from the standpoint of their degree of expression when equal energy exposures are used.

4. Reducing losses of laser radiation during interaction with the sclera through well-founded selection of the space-time characteristics of the radiation and measures geared toward ensuring the safety of both the patient and medical personnel may increase the effectiveness of transscleral laser coagulation.

Bibliography

1. Kirillov, A. N., Morskov, V. F., and Ustinov, N. D., "Dozimetriya lazernogo izlucheniya" [Dosimetry of Laser Radiation], Moscow, Radio i svyaz, 1983, 186 pages.

2. Legeza, S. G., and Privalov, A. P., OFTALMOLOGICHESKIY ZHURNAL, No 5, 1985, pp 300-302.

3. Legeza, S. G., and Privalov, A. P., OFTALMOLOGICHESKIY ZHURNAL, No 3, 1985, pp 170-173.

4. "Sanitarnyye normy i pravila ustroystva i ekspluatatsii lazerov" [Health Norms and Regulations for Configuration and Operation of Lasers], Moscow, 1982, 54 pages.

5. Tuchin, V. V., Maksimova, I. L., and Shubochkin, L. P., "Lazernyye puchki" [Laser Beams], Khabarovsk, 1985, pp 91-96.

6. Beckman, E. A., et al., AM. J. OPHTHALM., Vol 98, No 12, 1984, pp 788-795.

7. Boettner, E. A., US Air Force Contract N AF41(609)-2966-Michigan-T X 1967.

8. Boettner, A. E., US Air Force Contract N 41609-74-C-008-Michigan T X 1974.

9. Fine, J., PHYS. MED. BIOL., Vol 30, No 6, 1985, pp 561-571.

10. Halldorson, T., and Landehol, C. J., APPL. OPTICS, Vol 17, No 24, 1978, pp 3948-3958.

11. Marchall, W. J., AM. J. INDUST. HYG. ASS., Vol 41, No 8, 1980, pp 547-551.

12. Sliney, D. H., "Lasers in Biol. Med.," 1980, pp 421-442.

13. Smith, R. S., AM. J. OPHTHALM., Vol 66, No 1, 1968, pp 21-31.

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Surgical Plasma System Transferred to Institute

18402050 Moscow MEDITSINSKAYA GAZETA in Russian 17 May 89 p 4

[TASS story: "'Fakel' Put Into Operation"]

[Text] Representatives of the Soviet Charity and Health Fund today transported the Fakel surgical plasma system to the State Scientific Research Oncology Institute imeni P. A. Gertsen. The unit, which cost several tens of thousands of rubles, was given over to the institute free of charge.

It is especially valuable for researchers and oncologist-surgeons. The Fakel, the only one of its kind in the world, has unique properties. The system has successfully completed a test period and has earned high marks from the specialists. The developers of the unit are scientists from the Moscow Scientific Research Institute of Power-Engineering Machine Building of the Moscow Higher Technical School imeni N. Ye. Bauman.

"Our system may be used in many branches of medicine," said A. Pekshev, one of the instrument's creators. "And above all in oncology, which especially needs new therapeutic hardware."

Ultraviolet Lasers for Eye Surgery

18400651 Moscow ADVANCES OF SCIENCE AND TECHNOLOGY in English No 17, 19 Jun 89 pp 1-2

[Article by Victor Belitsky]

[Text] Researchers working at Professor Svyatoslav Fyodorov's Eye Microsurgery intersectoral complex (Russian acronym—MNTK) have come up with a unique mode of surgery that makes it possible to correct eye defects. In treating myopia, astigmatism and presbyopia, surgeons use ultraviolet laser units instead of scalpels; this helps reduce damage and speeds up healing processes in the eye's fragile tissues.

Says Yefim Beilin, MNTK's laser and optics laboratory chief:

"This type of laser appeared a mere five years ago. When researchers began to study the effect of the so-called long-range ultraviolet (wavelength—193 nanometers) on different materials, organic tissue included, they discovered an interesting phenomenon—the laser impulse destroys intra-molecular bonds without heating them up (this could be defined as cold vaporization). Each laser impulse vaporizes a 0.1-0.2 micron tissue layer, leaving a completely smooth surface. After that a surgeon can shape this surface as he sees fit.

"While performing eye microsurgery, ophthalmologists have to deal with the collagen protein, which makes up the eye's cornea. Ultraviolet laser rays cannot pass through it; the whole energy of the impulse is used to destroy collagen layers, and there is a definite link between the amount of laser light and collagen vaporization. It is possible to calculate the entire process in advance—after determining the type of tissue, one can compute the amount of laser impulses needed to remove a layer. In this way surgeons are able to create a lens-shaped cornea and, consequently, to dramatically improve the patient's eyesight. Myopia and presbyopia can also be corrected—all one has to do is make slight adjustments in the cornea's shape. As distinct from conventional surgery, which alters the cornea's shape by incisions and subsequent healing, laser surgery is 100-per cent effective, with no deviations observed. A surgeon using an ultraviolet laser device can treat rather acute cases. Whereas radial keratotomy (a mode of conventional surgery performed at MNTK) could previously handle only minus eight dioptres, the new surgical technique can treat minus thirteen dioptres.

"Still things are not as simple as one might think. The above mentioned process is carried out on a flat surface. However, in order to mold a lens out of the eye's cornea, one has to subject curved surfaces to special treatment. We have managed to obtain a laser beam with varying energy density—this makes it possible to enhance density either in the beam's center or along its sides. It goes without saying that a certain amount of the cornea must be left intact (about sixty per cent) lest the eyeball be deformed. When operating on elderly people, surgeons can afford to remove an even greater part of the cornea; younger people must be operated on with extra care, as their collagen content is markedly lower.

"And now a few words about the state of the laser-treated tissue. It has been established that after a specific time period, the cornea becomes covered with an epithelium, a surface cell layer, regaining its former transparency. So, no traces of the operation are visible.

"To date, forty-two patients have been treated by ultraviolet laser at the MNTK. In most cases people had their leukoma removed and their eyesight corrected at the same time. Each operation lasts no more than a minute (it took 72 seconds to perform the longest one). All operations have proved to be successful, but long-term after-effects are virtually unknown, as the last operation was just eight months ago. But the doctors are optimistic, because this form of treatment is absolutely painless, causes very little tissue damage and allows them to pinpoint affected areas with great accuracy."

Effective, Simple Cancer Diagnostic Method

18400583 Moscow ADVANCES OF SCIENCE AND TECHNOLOGY in English No 14, 17 May 89 pp 1-3

[Article by Tatyana Surikova]

[Text] A unique method and equipment for the early diagnostics of cancer has been developed by the Moscow University's Nuclear Physics Research Institute and the Third Moscow Medical Institute. This equipment will be produced by Bio-Fotonikf, a recently founded joint Soviet-West German venture.

"The fluorescent contrasting method is based on the capacity of malignant cells and tissues to accumulate an enhanced (as compared to healthy tissues) concentration of glowing substances," said Leonid Rubin, Moscow University professor. "An optical survey of tissues (in the spectral range of a dye's glow) enables the detection of the zone of its enhanced concentration and, hence, localization of a tumour."

The Portrait of an Invisible Danger

...The beam of an endoscope with a monochromatic glow source is sliding along the internal surface of the stomach. Through special light filters which absorb this beam of a single colour, a TV camera sends the picture onto a monitor. The dark surface of the mucous membrane appears on the screen. Suddenly a glowing spot emerges. A dangerous zone is detected: this is either a malignant tumour, or tissue which is on the way to degeneration. Having coloured the dangerous zone with a dye (fluorescein) which can accumulate only in a cancer-affected tissue and glow under the effect of light, the researchers have, at last, caused the evasive invisible enemy to betray itself.

A sample from a tissue section which has aroused suspicion is taken for histological analysis. Research has shown that in 95 cases out of 100 the origination of the malignant degeneration of cells is confirmed at the earliest stages.

The Rehabilitation of Fluorescein

Specialists all over the world searched for a simple and accessible method of diagnosing oncological diseases for many decades. The road taken by a team of researchers headed by Leonid Rubin, D.Sc. (Biol.) and Viktor Polsachev, Cand. Sc. (Med.), was long used by science and rejected. For a long time the optimum dye for diagnosing cancer by fluorescent contrasting could not be found. The most well-known dye (haematoporphyrin) which is used in some countries for research has fun [sic] fundamental drawbacks. For instance, it takes a considerable time (about a month) to remove it from the human body. In this period the patient must be kept in darkness, otherwise under the effect of light (even electric lighting) this substance begins destroying unaffected tissues. Besides, it can accumulate both in malignant and healthy cells.

Other dyes with similar properties, which are harmless for the human body, (and fluorescein is among them) have not always accumulated in a malignant tumour for reasons as yet unknown. In half of the cases the absence of glow has not guaranteed the absence of cancer. Late in the 1960s, fluorescent contrasting was recognised unsuitable for the diagnostics of cancer. The remarkable properties of fluorescein—exits from the human body within two days, is cheap and easily accessible—were ignored.

Having recently decided to return to that dye, Soviet scientists found out which biochemical mechanisms control its accumulation in the cell. Then they learnt to regulate them and caused a degenerating cell to feed on fluorescein not occasionally, but constantly, in the needed quantity. These mechanisms comprise the scientific foundation of the method and are the subject-matter of the invention.

A Catalyst Comes to the Rescue

"In young cancer cells a very intensive exchange of substances takes place," Professor Rubin said. "The degenerated tissue grows at an unprecedented rate and pumps an enormous amount of nutrients out of the blood. Along with nutrients, fluorescein injected into the human body gets into the degenerated tissue, where it accumulates, compelling the tissue to glow. But even a cancer cell sometimes has a poor appetite. This explains the setbacks of our predecessors who used fluorescein for diagnosing oncological diseases. We have established that the activity of cells can be stimulated by the most common catalysts. This is used in our technique: along with a dye, physiologically active substances are introduced into the bloodstream. Then even a temporarily dormant tumour awakens.

"To ensure the high reliability of fluorescent diagnostics we have improved optical observational devices. Conventional endoscopic equipment was provided with a special television camera with a set of light filters capable of absorbing monochromatic light waves during the transfer of an image to the monitor. A special light source was created. It gives such emission (required to see a tumour glowing in another spectrum). Instead of a traditional laser, the device uses a mercury-vapour lamp with more intensive emission. In addition, we have worked out a system of transforming data for computer-processing of information. All these technical innovations are being patented in the United States, Canada, France, Great Britain, Japan and other countries.

"Over 1,000 patients have been surveyed by the fluorescent contrasting method in cancer clinics in Moscow, Tallinn and Krasnoyarsk. In the main these are patients from the risk group with chronic gastritis, ulcers, polyps, which can develop into cancer. The method has proved so simple that it can be used for preventive purposes too (in the same way as photoroentgenography is used during mass medical checkups).

However, malignant tumours of hollow organs accessible to endoscope scanning represent only a third of oncological diseases. How can we detect them in other organs, (for instance, the pancreas) which so far cannot be observed visually? Fluorescent contrasting can be effective here too. Tumours of any organs can apparently be made visible by the tomography method, if fluorescein is enriched with substances capable of reacting to the electromagnetic effect. Such a preparation has already been created. If its clinical tests are successful, tomography-based contrasting will also be used in cancer diagnostics."

In December 1988, in Munich Moscow University and BMspektronik, a West German firm, signed in Munich

an agreement establishing the first joint venture—Bio-photonikf—on West German territory. It will produce unique equipment for oncological diagnostics. Under the contract, the West German side will be responsible for the material and technical aspects, while the Soviet side has offered technology, possessing 59 per cent of the authorized capital.

Management of Burns Incurred at High Altitudes

18402009 Frunze ZDRAVOOKHRANENIYE KIRGIZII in Russian No 1, Jan-Feb 89 pp 50-52

[Article by T. A. Aralbayev, Chair of Surgical Diseases, Kighiz State Medical Institute]

[Abstract] Case study analysis at the Kirghis SSR Burns Center in Frunze over a ten-year period concentrated on 19 patients who incurred burns at altitudes 2000-2500 m above sea level and were treated in Frunze (760 m). The patients were regarded as adapted to high altitudes, and their cases were noteworthy for high mortality during management in Frunze (26.3%, or 5/19). The mean mortality figure for all burn cases in Frunze in that timeframe was 3.99%. A key factor in high mortality was attributed to the phenomenon of deadaptation when the patients were transported to Frunze, and the death rate was directly related to the speed with which patient transfer took place. Thus, of the three patients transferred within four days of the injury two patients died; of seven patients transferred within 15 days two succumbed, and of nine patients transferred with a delay of more than 15 days only one was lost. The mortality was, of course, related to the severity of the burns, a factor calling for more immediate transfer to the burns center. In addition, hospital stays of the deadapted patients were much longer than the norm, with an average of 81.1 days versus 21.7 days for lowlanders. The adverse effects of deadaption from high altitude to sea level were also evident in a number of clinical parameters, including prolongation of the shock phase by five to six days. On balance, clinical evaluation demonstrated that transfer of burns patients from high to low altitudes should be preceded and supported by infusion of low doses of blood substitutes in combination with cardiovascular agents and analgesics. Insofar as possible, such transfers should be limited to patients that had been at high altitude for not more than one to two days prior to the injury, and only in case of absolute need in the absence of adequate medical facilities. Shock, cardiovascular decompensation, liver failure, toxemia, sepsis, and high temperatures serve as contraindications to transfer.

UDC 616.98:579.852.13-07:616.24-008.4

Respiration in Botulism

18402012a Moscow SOVETSKAYA MEDITSINA in Russian No 1, Jan 89 (manuscript received 24 Dec 87) pp 88-91

[Article by V. V. Nikiforov, O. V. Stepanova, Ye. V. Vikhrov, V. N. Nikiforov, V. N. Semenov, and V. A. Yeroshina, Chair of Infectious Diseases, Order of Lenin Central Institute for Advanced Training of Physicians, Institute of General Resuscitation, USSR Academy of Medical Sciences, Moscow]

[Abstract] In view of the fact that the most frequent cause of death in botulism is acute pulmonary insufficiency, pulmonary function tests were evaluated for 63 patients suffering from botulism, to derive criteria for implementation of artificial ventilation as a life-saving measure. The key observations demonstrated that a reduction in the vital capacity to 10 cm^3/kg or lower, in combination with a reduction in the respiratory volume to 5 cm^3/kg, is indicative of approaching respiratory collapse and rapid onset of apnea, requiring heroic measures. In general, a drop in the vital capacity to 20 cm^3/kg requires that the patient be transferred to intensive case, and a decrease to 15 cm^3/kg requires that resuscitation be implemented. References 11: 7 Russian, 4 Western.

Use of Immobilized Enzyme 'Profezim' in Treatment of Purulent Wounds

18402013a Alma-Ata ZDRAVOOKHRANENIYE KAZAKHSTANA in Russian No 1, Jan 89 pp 37-38

[Article by A. S. Skirtachev, Central Medical and Sanitary Section, Tselinograd Oblast]

[Abstract] A report is presented on a therapeutic trial conducted with "Profezim," a preparation of protosubtilin immobilized on aminoethyl cellulose, in the management of purulent wound infections. The cohort consisted of 42 patients, with 82% of the cases complicated by golden staphylococcus, 15% E. coli, 1.9% by proteus, and 1.1% Ps. aeruginosa. The use of Profezim-based dressings accelerated wound healing, with the formation of an epithelial cover and an elastic scab within eight to ten days. By contrast, control patients managed in more conventional manner without Profezim showed a more sluggish healing process with scab formation delayed to the 13th to 14th day. The fact that Profezim reduced the duration of the wound healing process 1.5- to 2-fold and evidenced analgesic and anti-inflammatory properties points to its potential clinical usefulness. References 1 (Russian).

UDC 576.852.1:576.8.095.13

Dissociative Variability of Antibiotic Production by Actinomycetes in Weak Magnetic Fields

18402010a Minsk ZDRAVOOKHRANENIYE BELORUSSII in Russian No 1, Jan 89 (manuscript received 2 Mar 88) pp 44-45

[Article by Ye. A. Kapitanov, Chair of Microbiology, Grodno Medical Institute]

[Abstract] Cultures of Str. kanamyceticus and Str. globisporus were shielded from natural geomagnetic field and static electricity fluctuation by a microanaerostat in order to test the effects of shielding on antibiotic production. Within the microanaerostat the magnetic field was attenuated by a factor of 10^{-2} oe. Long-term recultivation under conditions of shielding had variable effects on antibiotic production attributable to clonal dissociation. In general, antibiotic production by Str. kanamyceticus was enhanced when tested on such susceptible bacteria as B. cereus, B. megatherium, B. anthracis, M. smegmatis, E. coli, staphylococcus, and B. subtilis. However, antibiotic production by Str. globisporus was diminished. References: 2 (Russian).

Correction of Exertion Hypoxia With a Liposomal Form of Adrenaline

18402011b Moscow TEORIYA I PRAKTIKA FIZICHESKOY KULTURY in Russian No 2, 1989 pp 42-45

[Article by V. R. Tyutyunnik, V. P. Pozharov, T. D. Minyaylenko, M. I. Kalinskiy, V. K. Lishko, M. M. Seredenko, and A. V. Stefanov, Institutes of Biochemistry imeni A. V. Palladin and of Physiology imeni A. A. Bogomolets, Ukrainian SSR Academy of Sciences; Kiev State Institute of Physical Culture]

[Abstract] Treadmill endurance studies were conducted on male Wistar rats (200-250 g) to assess the effects of intraperitoneal administration of liposomally encapsulated norepinephrine (LEN; 15 μg/100 g) in terms of endurance and metabolic parameters. The results demonstrated that while soluble norepinephrine did not improve treadmill (44 m/min) endurance of physically trained rats, administration of LEN 15 or 30 min prior to the test enhanced endurance by 81% to 90%. Metabolic studies and blood chemistries demonstrated that LEN facilitates lipid metabolism with attendant enhancement of the energy balance and sparing of the carbohydrate pool. As a result, plasma levels of lactic acid are reduced both before and during the stress test, delaying the onset of metabolic acidosis and of the oxygen debt. Furthermore, following LEN administration there was no evidence of an increase in lipid peroxidation products in the plasma, although in control rats a two-fold increase was observed. Figures 2; references 9: 7 Russian, 2 Western.

Physiologic Research on Self-Regulation of Cardiac Rhythm Based on Computer Biofeedback

18400464 Moscow TEORIYA I PRAKTIKA FIZICHESKOY KULTURY in Russian No 1, Jan 89 p 46

[Article by F. F. Vodovatov, Moscow Electronics Machine Building Institute]

[Text] With insufficient psychological preparation, an increase in the degree of emotional stress before a competition leads to the disruption of higher nervous activity and, consequently, to an imbalance in the mechanism regulating involuntary (automatic) physiologic responses and, eventually, to irreversible pathological phenomena—above all, in the cardiovascular system.

Recording and converting current electrical bioinformation about the involuntary physiologic responses of the cardiovascular system, using a computer to bring it up on a video-terminal screen, and presenting the video information to athletes presuppose engaging consciousness at earlier stages of stress and hence the capability of diagnosis and self-regulation of the functional state of the cardiovascular system by means of external feedback through the optic canal.

Cardiac rhythm is the most studied indicator of the activity of the cardiovascular system and overall response of the body to external effects. Therefore, studying the self-control of cardiac rhythm, which expands the body's adaptation capability, increases an athlete's stability during the precompetition period.

An experimental unit for diagnosis and self-regulation of cardiac rhythm, which was developed on the basis of the series-produced Mikrosh personal computer, permits an athlete in the precompetition period to use an ordinary television and cassette tape recorder connected to a Mikrosh to keep the frequency of his cardiac contractions within specified bounds by using biofeedback, self-training, and other self-control methods. The unit's hardware and software collect information about the activity of the cardiovascular system over the course of a self-regulation (training) session and display it on a video-terminal screen in the form of frequency charts [intervalogrammy] and histograms. Mathematical processing of the distribution of cardiac intervals yields an estimate of the degree of training and physiologic indicators, which indicates the degree of stress of the heart's regulatory mechanisms.

The institute is accepting orders for the manufacture of prototypes. Send orders to the following address: 109028, Moskva [Moscow], B. Vuzovskiy per. [B. Vuzovskiy Prospect], D 3/12, Moskovskiy institut elektronnogo mashinostroyeniya [Moscow Electronics Machine Building Institute], Kafedra fizvospitaniya [Physical Education Department], F. F. Vodovatov.

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UDC 612.411.611-018.54:616.45-001.1/.3

Splenic Role in Calcium Homeostasis in Blood Plasma in Stress and Normal Conditions

18402005a Kiev FIZIOLOGICHESKIY ZHURNAL in Russian Vol 35 No 1, Jan-Feb 89 (manuscript received 22 Jun 87) pp 17-21

[Article by N. M. Doroshenko and V. V. Korpachev, Kiev Institute of Endocrinology and Metabolism, Ukrainian SSR Ministry of Health]

[Abstract] Monitoring of plasma calcium levels was performed in male Wistar rats (180-220 g) and male chinchilla rabbits (2.5-3 kg) to assess the effects of splenectomy, physical stress, and bovine splenin administration and, thus, to define the role of the spleen in calcium homeostasis. Splenectomy in both species resulted in hypercalcemia, leading to a twofold increase in plasma calcium in the rabbits 15 days after splenectomy, and to a 33% increase in the rats. Intact and splenectomized rats subjected to physical stress (swimming for 1.5 h) responded with elevation of plasma calcium, which was more pronounced in the splenectomized animals. Administration of splenin to intact rats led to depression of plasma calcium levels after 15 days of relatively low doses (1:50 and 1:100 dilutions, 0.25 ml/100 g). Injection of splenin before stress testing to intact animals prevented the rise in plasma calcium seen with control rats, with basically similar effects seen in splenectomized rats treated with splenin before stressing. On balance, the data appeared to indicate that the spleen is involved in homeostatic control of plasma calcium levels. References 15: 1 Ukrainian, 12 Russian, 2 Western.

UDC 616-001.8:612.01.43

Effects of Hyperthermia in Dogs on Respiration, Gas Exchange, and Acid-Base Balance

18402005b Kiev FIZIOLOGICHESKIY ZHURNAL in Russian Vol 35 No 1, Jan-Feb 89 (manuscript received 26 Oct 87) pp 21-25

[Article by M. M. Seredenko, V. P. Pozharov, T. D. Minyaylenko, V. I. Boyko, and L. A. Grabovskiy, Institute of Physiology imeni A. A. Bogomolets, Ukrainian SSR Academy of Sciences, Kiev]

[Abstract] Trials on 15 dogs led to the observation that elevation of the rectal temperature to 40-41°C is accompanied by an increase in the respiratory minute volume and a positive correlation between the respiratory volume and the respiratory rate. Maintenance of the rectal temperature at 42°C for 2 h resulted in the establishment of an isoventilatory pattern, with a negative correlation between the respiratory period and the respiratory volume. The resultant pronounced hypocapnia results in uncompensated respiratory alkalosis, pushing the pH to 7.46. Figures 3; references 12: 8 Russian, 4 Western.

UDC 542.978+577.15

Effects of Emotional Stress and Pain on Hormonal Functions of Thyroid and Parathyroid Glands

18402005c Kiev FIZIOLOGICHESKIY ZHURNAL in Russian Vol 35 No 1, Jan 89 (manuscript received 27 Apr 87) pp 72-75

[Article by V. I. Kuripka, L. Ye. Belokon, and V. S. Yakushev, Zaporozhe Medical Institute, Ukrainian SSR Ministry of Health]

[Abstract] Wistar rats were employed in extensive studies on the effects of prolonged pain with an emotional component and induced myocardial infarct on endocrine function of the thyroid and parathryroid glands. The form of stress under study, pain (Selye's triad) and myocardial infarction, affected the hypothalamus-pituitary-thyroid axis in an adverse manner, leading to diminished synthesis of thyrotropin and prolactin. The latter adversely affected dopaminergic systems, with even further depression of the norepinephrine:serotonin ratio. A roughly fourfold depression of tri-iodothyronine production entailed additional pathophysiological changes in functions dependent on this hormone. Figures 1; references 13: 7 Russian, 6 Western.

Health Ministry Approves New Economic Mechanism

18402051 Moscow MEDITSINSKAYA GAZETA in Russian 2 Jun 89 p 2

[Article under the rubric "Official Department": "In the Board of the USSR Ministry of Health"]

[Text] The board of the USSR Ministry of Health examined the topic "Main Points of the New Economic Mechanism in Health Care."

The new economic mechanism in health care calls for radically changing the budgetary finance system and switching from the allocation of budgetary funds on the basis of individual expenditure items to financing based on long-range stable norms. It includes a combination of budgetary financing of the activity of health care institutions and the development of paid services rendered to the public and the performance of work based on contracts with enterprises, organizations, and institutions on a cost-accounting basis. Various forms of operation are used: lease relationships, cooperative and individual work, plus flexible work regimes.

In the future, budgetary finance norms will be established for health care institutions by the appropriate health care organs, as well as by the territorial medical associations, on the basis of methodological recommendations of the USSR Ministry of Health that have been coordinated with the USSR State Plan [Gosplan], USSR Ministry of Finance, USSR State Committee on Labor, and All-Union Central Council of Trade Unions.

Revenues from cost-accounting activity related to the provision of paid forms of medical services will serve as additional sources of funds for health care institutions.

Moreover, an additional source of financing for health care institutions will be the money collected by the health-and-epidemiological service (in accordance with the law) from enterprises, organizations, and citizens for violations of sanitary-hygiene and antiepidemic rules and regulations and for injuring public health through poor working conditions, environmental pollution, and production technology violations. Also included here will be a portion of the money saved as a result of the reduction in morbidity accompanied by temporary disability, plus voluntary contributions from enterprises, social organizations, philanthropic funds, cooperatives, and citizens.

As an experiment has shown, the total sum of nonbudgeted monies could constitute more than 10 percent of the allocations in the state budget.

The monies received from all sources form a single fund for financing the capital of a health care institution. They serve to compensate for expenses and to create economic incentive funds in the institution.

Workers will be paid and receive material incentives on the basis of quantity and quality of labor and the personal contribution each worker makes.

The board, for the most part, approved the draft of the "Main Points of the New Economic Mechanism in Health Care" and recommended that it be submitted for apporval by the USSR Council of Ministers Commission on Improving the Economic Mechanism.

The matter of the progress of the Soyuzmedtekhnika All-Union Association in fulfilling the decrees of the CPSU Central Committee and USSR Council of Ministers geared toward improving Soviet health care was examined. It was noted that the solution of the problem of strengthening the material-and-technical base of health care is being held up by the unsatisfactory situation regarding meeting the needs of the USSR Ministry of Health for medical equipment—only 56 percent of its needs being met.

The board outlined a number of measures to improve the provision of medical equipment to the health care sector.

Health Ministry Explanation of Nuclear Power Concerns Criticized

18400450 Kiev FILOSOFSKA I SOTSIOLOGICHNA DUMKA in Ukrainian No 1, Jan-Feb 89 pp 47-54

[Article by N. V. Panina: "Democratization in Sociology Mirror"; first paragraph is FILOSOFSKA I SOTSIOLOGICHNA DUMKA introduction]

[Text] Natalya Viktorovna Panina is a candidate of philosophical sciences and a scientific associate at the Department of Scientific Information in the Area of Social Sciences, UkSSR Academy of Sciences. The sphere of her scientific interests includes personal sociology and psychology and the sociology of medicine. She is the author of sections in the collective monographs "Semya i obshchestvo" [Family and Society] (Moscow, 1982), "Stil zhizni lichnosti" [The Individual's Life-Style] (Kiev, 1982) and "Zhiznennyy put lichnosti" [The Road of Life for the Individual] (Kiev, 1987) and articles in SOTSIOLOGICHESKIYE ISSLEDOVANIYA, VESTNIK AMN SSSR and other journals.

The Legend of Radiophobia

"One has even found a capacious word "radiophobia"—for those who do not trust specialists anymore... Indeed, why such distrust?" (O. Adamovich)

On June 8, 1988, LITERATURNAYA GAZETA published Yu. Shcherbak's article "Facets of Optimism," wherein the author shared his reflections on the scientific conference "Medical Aspects of the Accident at the Chernobyl AES," which took place in Kiev in the spring of 1988. The conference dealt with the socio-psychological consequences of the Chernobyl catastrophe, chief among them the so-called radiophobia

phenomenon. "Physicians are perturbed by the widespread and possible health consequences of this ailment. The causes that brought about the phenomenon were analyzed, and unfavorable criticism on the address of the media was sounded,"[1] the author wrote.

This diagnosis (from the psychiatric field) for residents of areas that had suffered from the explosion at the ChAES [Chernobyl AES] surfaced immediately after the accident and spread with lightning speed. At that time no mass examinations of the population by specialists (psychiatrists and psychologists) had been conducted yet; still, thanks to easy-going organizers of public health and radiologists, the radiophobia diagnosis has gained a foothold in their socio-psychologic analysis of the disaster consequences. Chairman of the National Commission on Radiation Protection and USSR Academy of Medical Sciences Academician L. A. Ilyin[2] and UkSSR Minister of Health A. Ye. Romanovskiy[3] made absolutely official statements on radiophobia to the press.

In the process of their direct activities on studying and eliminating the consequences of the Chernobyl accident, the majority of physicians and specialists in the nuclear power field encountered a number of complex and not always clearly solvable problems that were outside their respective fields of expertise. However, not only were they making diagnoses with extreme ease and haste, but they were also immediately pointing to the "main source" of this serious disease—various intelligentsia strata and direct participants in the elimination of consequences of the AES accident.

Exactly how are these quite categorical and unambiguous statements substantiated? Although in a booklet by Administration Director of the UkSSR Ministry of Health V. P. Antonov, "Radiatsionnaya obstanovka i yeyo sotsialno-psikhologicheskiye aspekty" [Radiation Situation and Its Socio-Psychologic Aspects], the words "socio-psychologic aspects" had been pretentiously put in its title, the radiologist does not make a single reference to data of socio-psychologic studies. He himself states that his own convictions are the source for his categorical conclusions. "It is our deep conviction that disquieting and sometimes even panic-ridden information was originating among technical intelligentsia." And later: "Among causes of higher vulnerability of the intelligentsia and propagation of phobic reactions in their midst one should mention a high degree of 'psyshological aversion' to radiation...."[4]

Because officials are so generously diagnosing the "radiophobia," without as much as going to the trouble of clarifying the contents and symptoms of their conjecture-born child, on whose account it is so easy to write off all deficiencies of public health and social policies that manifested themselves after the nuclear plant accident, we shall dwell in somewhat greater detail on phobias that have formed in the medical science by now.

Phobias (morbid fears) are considered to be types of obsessions[5] which constitute a special type of disease. In the process of studying obsessions, scientists (neuropathologists, psychiatrists and physiologists) have differed in assessing the causes and degree of individuals' congenital bias towards this type of disease.

For instance, I. P. Pavlov thought that specific features of disturbances of the higher nervous activity during obsessions have commonalities with disturbances originating in the state of delirium, but with lower intensity of pathological excitement.

A German psychiatrist Emil Krepelin, the creator of the modern classification of mental diseases, used to put them in the group of "constitutional mental diseases," together with the manic-depressive psychosis and paranoia.

At the beginning of the 20th century a French psychopathologist Pierre Jeane, an outstanding specialist in the field of neuroses, identified a disease which he called psychosthenia; he considered obsession a symptom of the disease. The scientist reckoned it with ailments caused by congenital features of one's nervous system.

The majority of Soviet psychiatrists consider obsessions "a syndrome of classical forms of neuroses"[6] and, not ruling out their psychogenic origin, stress a certain organic predisposition to this type of disease, related to a specific type of nervous system. The well-known Soviet psychiatrist A. M. Svyadoshch thinks that the psycogenic factor can play an important role in a concrete psychological content of a fear, although phobia per se is physiologically conditioned.[7]

Thus, regardless of certain discrepancies in their views on the genesis and etiology of phobias, virtually all researchers point to the same typical features of their manifestation.

The first and main typical feature of any phobia (as a type of obsession) which makes it substantially different from other mental diseases is that the subject is aware of its morbidity. I. M. Balinskiy, the author of the Russian term "navyazchivyye sostoyaniya" ("obsessions") (1858) and a founder of the domestic psychiatry, stated that strangeness of conscience is what all phobias have in common. As a rule, patients with a phobic syndrome comprehend the absurdity, senselessness and morbidity of their fear, and in their conversations with a physician they express their critical attitude about their condition.[8]

Another typical feature of phobias is their invincibility. Despite a conscious will effort, a person tries to overcome his or her fear using rational arguments and logical conclusions (and one's thinking does not undergo any changes in cases of phobias); however, not only it does not cause this diseased condition to disappear, but on the contrary, it facilitates reinforcement and generalization of the fear. This happens because the severe psychoemotional state of fear has a psychological basis and is reinforced in the accompanying vegetative and locomotive symptomatology. "A terror-stricken person turns pale, shivers and chatters, his or her forehead gets bathed

in clammy sweat, respiration accelerates and becomes jerky, and urination, and sometimes defecation, become more frequent. At the same time, locomotive disturbances are observed. Sometimes they are reduced to a stuporous state, when one's feet kind of stick to the ground and one's voice disappears. In other cases, the fear is manifested in a fidgety-motor anxiety, when the sick cannot stay put: now they stand up, now they sit down again, now they walk from one corner of the room to another, unable to calm down or listen to calming words."[9]

Mind you, I am presenting psychiatry truisms, data which give a physician the right to diagnose a "phobia" when he or she spots them.

I wonder if those who declare the wide range of radiophobia and have the guts to diagnose it in entire social groups have had a chance to observe such a condition in residents of the city of Kiev.

The third typical feature of phobias (as a direct consequence of the preceding one) is the origination of the disease without any preliminary information on the object, because not just an actual reproduction of the object of fear, but also any mention of the object provokes a corresponding response.

Lastly, the fourth feature of a phobia consists of ritualistic actions that often accompany it, such as repetitive hand washing and "sterilization" of certain surrounding items, while at the same time not following elementary hygiene standards, etc. As a rule, phobic rituals are of symbolic character and differ from purposeful behavior in their senselessness and rubbishness, as well as their forced character relative to the subject him- or herself, which disorganizes his or her normal vital activity. It is impossible to stop a sick person's ritualistic behavior by any rational arguments without special treatment.

So to what extent have the above features of phobic manifestations been observed in the population living and working in regions adjacent to the ChAES? Our own life observations have been spotting the opposite pattern: an increased interest in any information on the radiation situation, behavioral changes that depend on incoming information and physicians' recommendations, rational validity of their own misgivings because of knowledge circulating in the society, etc. Incidentally, the above mentioned booklet by V. P. Antonov draws, in broad strokes, approximately the same picture of mass behavior.

However, like other people responsible for medical support and investigation of the effects of the ChAES accident, V. P. Antonov diagnoses "radiophobia." Well, they are not psychiatrists, so they could at a stretch diagnose the entire population (or a large part of it) with "radiophobia," "radioschizophrenia," "radioepilepsy," or what have you. They probably have not done this only because "radiophobia" simply sounds better.

But maybe the authors use the term "radiophobia" not in its direct (medical) meaning, but, so to speak, "allegorically"? You see, one uses sometimes such categories as "schizophrenic" or "idiot" without referring to a complicated biomedical complex of symptoms these diseases manifest themselves through. Then one must take into consideration the fact that such allegories are only used with the intention to insult and humiliate the personality of those these definitions are aimed at. It is so much more unnatural to hear such characteristics from physicians, especially those at the helm of an organization of public health.

And while the specialists keep silent, a VECHERNIY KIEV reporter A. Sidorenko has set to mass diagnostics. At a VECHERNIY KIEV fest (within the framework of an entertaining attraction, where one conceived to determine radionuclide content in the bodies of those who wished to do so), having gained experience in psychodiagnostics while interviewing A. Romanenko and L. Ilyin, he took, so to speak, a side glance at the line of those who wished to avail themselves of the guest service of the USSR Academy of Medical Sciences All-Union Scientific Center of Radiation Medicine, and immediately diagnosed "the majority of those present as "phobia sufferers,"[10] spreading his "highly skilled" conclusions via 346,500 copies of the newspaper. And this "newly-made specialist' thinks one has no business to get offended by phobias, because radiophobia "is not a mental disease." But had he opened any book on psychiatry or a medical dictionary before lecturing hundreds of thousands of people, he would have seen that phobias **are** mental diseases.

Have psychiatrists conducted mass epidemiological examinations of the population? Has anybody studied the dynamics of people seeking medical advice of psychoneurologists, psychotherapists and/or psychiatrists? Based on what evidence and indicators has one drawn the conclusion on the radiophobia phenomenon, let alone on its spread?

In mass literature and in speeches of highly competent authors there are neither references nor even mention of any psychiatric studies. However, the "radiophobia" stamp is already attached a priori to that part of the population that is (or will be) showing their keen interest, let alone anxiety, in their own fate and health, the fate of their children and health prospects of the population that suffered from the accident at the Republic's nuclear power plant, those who will turn for clarification to newspapers, official authorities and physicians. It is these very actions that Kovalenko and Karasyuk qualify as radiophobia symptoms.[11]

However, it is not out of the question that the "method" they invented will also please a lot of other officials when they face the need to make excuses to the society. For instance, it is well known how much the ecological

situation in the Republic—both in industrial and residential and recreation areas—has deteriorated. Apparently, the public should be informed of this. So should not one accuse the public with, say, "ecophobia"?

One would think that the times when social initiative and personal concern about human rights (in particular, the right to life) violations were sufficient for a psychiatric diagnosis have sunk into oblivion. Not long ago a resolution was adopted that increases a psychiatrist's responsibility for identifying a diagnosis. Naturally, this refers to individual diagnostics (I think nobody yet has hit upon an idea of mass a priori diagnostics), based on a comprehensive examination of a person by various physician-specialists. A judgement on morbidity of the population as a whole and on the extent of the spread of a disease can only be made based on medical statistical data.

Without specific scientific data obtained as a result of psychiatric examination of the population in regions adjacent to the accident zone, including Kiev, we, unlike organizers of public health and radiologists, do not take it upon ourselves to draw categoric conclusions on the psychopathological condition of the population, "based only on our deep conviction." Here, one can only rely on the juridical right of people for a presumption of their mental health.

However, in order to indirectly refute the abstractly derived assessment, we would like to present specific scientific data obtained as a result of a study conducted by a group of sociologists and psychologists* in a unit that performed decontamination work in zones that had been subjected to radioactive contamination (at the ChAES and adjacent territories).

The studies were conducted from December 1986 to July 1987. They covered various aspects of vital activities of people working under extreme conditions. The study contingent consisted of people drafted for a special muster. All in all, 979 people were polled. Their average age was 35 years (with the standard deviation of 6 years).

Results of the poll made it possible to analyze the attitude of people working under the conditions of increased radiation hazard about various aspects of their life and work, as well as specific features of their psychological and health condition. Here we shall dwell on the bulk of obtained data**, only taking into account certain indices of psychological condition, which can to a certain extent indicate the presence or absence of neurotic symptomatology, and factors that determine people's psychoemotional stability.

Along with evaluating general characteristics of a person's functional psychological condition (health condition, activity and mood), anxiety level was measured using Spielberger's test, which was first used in the USSR by Yu. L. Khanin.[12]

The poll used the reactive anxiety scale, which makes it possible to determine the measure of tension (anxiety, preoccupation, nervousness) not as a stable personality characteristic but as a condition in a person caused by a certain situation that has formed at a given moment in time. The anxiety index varies between 20 and 80 points. An index of 30 or fewer points characterizes low, 31-45—moderate, and 46-80—high anxiety. It should be stressed that not only a high, but also a low degree of anxiety is a negative indicator, because "a certain level of anxiety is a natural and mandatory feature of a personality's activity."[13]

The questionnaire included not just tests that measured peculiarities of one's functional condition, but also procedures aimed at studying relatively stable indicators, which change under conditions of an extremely intensive psychological effect of environmental factors. In particular, the "Life Satisfaction Index" test[14] was used, adapted by us, which reflects the general status of a person's psychological comfort and his or her strength of moral spirit, optimism and clearness of purpose.

A low grade on the life satisfaction scale indicates the degree of a person's apathy, general and psychologic depression, a lack of psychoemotional comfort, strength of moral spirit, optimism and clearness of purpose. The value of the life satisfaction index varies from 0 to 40 points, with 20 points being a conventional zero point between the positive and negative axes of the scale. Data obtained during the test tryout indicate that mean index of life satisfaction in a similar age-gender group (25-40-year-old men) was equal to 22.11 points.

Results of three studies conducted in December of 1986 and March and June of 1987 demonstrate the failure of assertions not just on the spread of a phobia, but also on a substantially higher than normal level of anxiety and depression (as indirect indicators of neurotic symptomatology).

On the average, the level of anxiety only slightly exceeds the upper limit of the standard (47.0 points), which is a necessary condition for mobilizing and increasing the level of activity under extreme conditions in order to overcome negative factors that destabilize a situation.

Table 1 presents data that characterize the social status of people before they participated in decontamination work.

Table 1. Effect of Social Status on Person's Psychological Condition

Social Status	Anxiety	Life Satisfaction
White collar workers with higher education	44.3	23.3
Workers	47.3	20.8
White collar workers without higher education	50.1	19.3

One can see that white collar workers with higher education, i.e., the very creative and technical intelligentsia

pronounced by Administration Director of the UkSSR Ministry of Health V.P. Antonov as the most susceptible to psychological factors of radiation, have an index of life satisfaction which indicates moral stability, spirits, purposefulness and the absence of depression and which is not only higher than that of workers and nonprofessional white collar people, but is also much higher than mean statistical index of life satisfaction registered under normal conditions. And their anxiety index is even lower than the upper limit of the norm.

The most unfavorable indices (a high level of anxiety and a low level of life satisfaction) was detected in white collar workers without higher education. One could hypothetically view this as their specific response to extreme radiation conditions, had we not had available data of other sociological and socio-psychological studies conducted under different conditions and for a different purpose. In our context it is inexpedient to dwell on this problem. It only should be noted that under normal life conditions this sociodemographic group is also characterized by more unfavorable socio-psychological indices and that the main factors responsible for this are their unsatisfactory material conditions and the content of work.

As to people working on decontamination of contaminated regions, results of the conducted studies made it possible to determine that their psychological condition was more related to their personal motivation rather to sociodemographic (age and belonging to a certain social group) factors.

Of course, when analyzing specific features of a person's attitude about his or her work, one should bear in mind that in this case one deals with very specific working conditions, when, on the one hand, a person cannot see, hear or feel health hazards, while on the other hand, in the process of doing the job there was a serious threat not just to the person's health, but to his or her life. Under such conditions, volunteers were enlisted for performing especially dangerous assignments. People who on their own initiative undertook to perform these especially dangerous assignments were guided by various motives. The questionnaire asked a question: "In your opinion, what was inducing people to perform especially dangerous assignments?" It would seem that the question does not directly appeal to a respondent's motives. However, psychologists are aware of the projection phenomenon, "a psychological protection mechanism consisting in unconsiously assigning to another person motives, features and virtues characteristic of the individual in question."[15]

Based on the existence of this mechanism, numerous projection tests were compiled and won wide recognition. This approach makes it possible to better reveal specific features of one's inside world, which one might not be aware of or might be consciously hiding for one reason or another, if one were asked to answer questions formulated too bluntly—point-blank, so to speak.

Results of comparing answers to this question to indices of people's psychological condition are presented in Table 2.

Table 2. Relationship Between Person's Psychological Condition and His of Her Assessment of Motives for Voluntary Performance of Especially Dangerous Assignments

Motives for Voluntary Performance of Especially Dangerous Assignments	Anxiety	Life Satisfaction
Understanding the extreme importance of the work for the people	45.5	22.1
A more acute feeling of one's duty and responsibility	45.6	22.3
Love of risk and the need to play with danger	50.0	18.6
I do not understand these people's motives	51.2	16.9
Desire to prove to oneself one's capacity for a heroic action	53.2	17.9
The desire to distinguish oneself and win a decoration	53.2	17.9
The need to earn peers' respect	47.1	20.3

In the series of data ranked according to the increasing level of anxiety one can identify two basic types of people.

The first type consists of workers with sufficiently high indices of psychological condition. It is they who named among main motives "A more acute feeling of one's duty and responsibility" and "Understanding the extreme importance of the work for people." Here one can vividly see how people's high moral standards (their moral potential aimed at caring for and responsibility for others) are linked to their general emotional and psychological condition and emotional comfort. And it must be specifically stressed that it is these motives that were mentioned most often, which indicates the prevalence of moral motivation for people who had shouldered the difficult task of removing the effects of the nuclear plant accident.

Fairly close to this type is a group of people that named as the main motive "The need to earn peers' respect." A certain narrowing of the sphere of responsibility is due to a slight reduction in the life satisfaction index and an increase in the index of anxiety.

The other type of person characterized by unfavorable indices is the self-affirmation-oriented person. Performance of especially dangerous work is linked in their conscience first of all to the desire to prove (to others or to oneself) one's capability for extraordinary action and thus to increase one's level of self-respect (or respect). It would seem that "Love of risk and the need to play with danger" would go together with strong nerves. However, people that named this motive are characterized by a fairly high level of anxiety. The indices are still lower in people convinced that "Desire to prove to oneself one's capacity for a heroic action" is the main motive for such

action. Those who think that such actions are due to "Desire to distinguish oneself and win a decoration" have the same low level of psychological comfort.

Of course, high work output requires incentives. Without getting into specific features of the differentiation of advantages that participants in decontamination work (this problem is covered in great detail in the above mentioned monograph) assign to various forms of moral and material incentives, we shall only present one fact, interesting from the standpoint of factors of psychological condition. Of all data ranked according to increasing level of anxiety, the highest indices of the psychoemotional condition were detected in people that had given preference to "presenting a memorial medal" to "Participants in Cleanup of the Accident at the Chernobyl AES," and the lowest—in people who had indicated "monthly bonuses (50 chervonets per worker)".

If one takes into account the fact that the medal per se did not give any privileges and just symbolized one's participation in the most important work for the country, in this situation a lot of people demonstrated the same indisputable advantage of moral incentives over material ones that was much more frequently spoken of from high podiums than it was believed in. One can see from the above data that this was not an accidental choice. Behind it is a set of high-range moral and psychological features peculiar to a large part of people we had examined. One can assume with a high degree of confidence that if instead of unsubstantiated statements on the spread of radiophobia among a certain "substantial part of the population," the authors of the term had conducted a psychologic study, they would have found the same picture.

Summarizing the results of studying the psychological condition of people that participated in the cleanup of the accident at the Chernobyl AES, we shall stress what in our opinion is the most important conclusion: a close relation between the psychoemotional stability and life satisfaction, on the one hand, and moral traits of a personality manifested in the feeling of one's duty and personal responsibility for other people and for the future of the development of society. According to our research data, such people were in the majority. This fact makes it possible to refute an unsubstantiated statement on an allegedly mass spread of radiophobia, which disorganizes the life and activities of people who for the first time encountered a radiation hazard. Moreover, a psychological stability of people able to live and work under extreme conditions turned out to be the decisive factor that made it possible to significantly reduce this very danger.

"One should estimate results of the accident without reading the tea leaves," said USSR Academy of Medical Sciences Academician L. A. Ilyin in his interview on the results of the conference "Medical Aspects of the Accident at the Chernobyl AES." In the same interview, commenting on Doctor R. Gail's position, he said: "It is bad when a non-specialist begins discussing special problems!" Here is more: "Terms, definitions and numbers that have been unfortunately brought into play overshadow all a person's positives, because it has been proven that conscience leaves for itself just one, negative leitmotiv."[16] L. A. Ilyin assessed such a position taken by a scientist as immoral.

Without getting into a discussion on the substantiability of the above feature of conscience, we fully support the general moral assessment of the irresponsible attitude in the selection of terms, particularly those characterizing the psychological effects of the accident at the ChAES. We hope that the chairman of the National Commission on Radiation Protection, USSR Academy of Medical Sciences Academician L. A. Ilyin himself and those involved in spreading, mildly put, an unfortunate term "radiophobia" will apply to themselves the same moral criteria. If one qualifies the above discussed peculiarities in the population's behavior as uneasiness about medical and socioeconomic consequences of the accident rather than as radiophobia, then one must treat differently those people who display a keen interest in the radiological situation: one must respect their right to truthful information, convincingly and with scientific justification decrease their mistrust in the contradictory reports, taking into account their opinion on social actions, etc.

Are the administrators of science and public health ready for this now? Or is it easier for them, as they have done earlier, to call a social public activity by a psychopathological term and answer all questions with one word - RADIOPHOBIA?

Footnotes

1. LITERATURNAYA GAZETA, 8 Jun 1988.

2. See: VECHERNIY KIEV, 13 May 1988.

3. See: PRAVDA, 30 May 1988.

4. Antonov, V. P., "Radiatsionnaya obstanovka i yeyo sotsialno-psikhologicheskiye aspekty" [Radiation Situation and Its Socio-Psychologic Aspects].

5. Frumkin, Ya. P., Voronkov, G. L. and Shevchuk, I. D., "Psikhiatriya. Tablitsy i skhemy" [Psychiatry: Charts and Diagrams], Kiev, 1977, p.10; "Sovetskiy entsiklopedicheskiy slovar" [Soviet Encyclopedic Dictionary], Moscow, 1981, pp 863, 1432.

6. Bacherikov, N. Ye., "Klinika i profilaktika psikhicheskikh zabolevaniy" [Clinical Picture and Prophylaxis of Mental Diseases], Kiev, 1980, p 70.

7. Svyadoshch, A. M., "Nevrozy" [Neuroses], Moscow, 1982, p 79.

8. See: Nerbikov, O. V., Korkina, M. V., Nadzharov, R. A. and Snezhnevskiy, A. V., "Psikhiatriya" [Psychiatry], Moscow, 1979; Svyadoshch, A. M., "Nevrozy"; Ushakov, T. K., "Detskaya psikhiatriya" [Pediatric Psychiatry], Moscow, 1973.

9.See: Zavilyanskiy, I. Ya. and Bleykher, V. M., "Psikhiatricheskiy diagnoz" [Psychiatric Diagnosis], Kiev, 1979, pp 50-51.

10. Sidorenko, A., VECHERNIY KIEV, 22 Sep 1988.

11. See: ARGUMENTY I FAKTY, 1988, No 16.

12. See: "Chelovek. Proizvodstvo. Upravlenie. Psikhologicheskiy slovar-spravochnik" [The Individual. Production. Management. Psychological Dictionary-Handbook], Leningrad, 1982, pp 146-150.

13. Ibid., p 147.

14. Neugarten, B. S., Havighurst, R. and Jobin, S. S., "The Measurement of Life Satisfaction", J. OF GERONTOLOGY, 1961, No 2, pp 135-143.

15. See: "Kratkiy psikhologicheskiy slovar" [Concise Psychologic Dictionary], Moscow, 1985, p 262.

16. VECHERNIY KIEV, 13 May 1988.

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** Based on principal results of the investigation, the authors' collective has prepared a monograph "Lyudyna v ekstremalniy vyrobnychiy situatsii" [Person in Extreme Production Situation], to be published by the "Naukova dumka" Publishing House in 1990.

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Morbidity Due to Malignant Neoplasms Among the USSR Population (1981-1985)

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[Article by V. V. Dvoyrin, G. F. Tserkovnyy, V. I. Gulaya, and V. P. Maksimova, Moscow]

[Text] Since the previous publication of the data on morbidity due to malignant neoplasms among the USSR population,[3] there have been changes in frequency, structure, and incidence of tumors in various populations and in certain territories. Evaluating those changes and using them to manage and plan oncological care will help to further improve the organization of the fight against cancer in our country.

The number of individuals with a first-time diagnosis of a malignant neoplasm continues to grow and reached 6,158,000 in 1985, exceeding the figure for 1981 by 10.7%. The overall frequency index grew over that period by 6.8% (to 222.2 per 100,000 from 208.1); the standardized index grew by 6.3% (to 185.1 per 100,000 from 174.1). In 1985, for the first time ever, lung cancer ranked No. 1 in the structure of the morbidity due to malignant neoplasms in the USSR, having knocked stomach cancer down to the next rung. Rectal cancer went from seventh place to sixth, cervical cancer from fifth to seventh, and malignant neoplasms of lymphatic and hemopoietic tissue from sixth to fifth (Table 1). Similar shifts also took place in the structure of the morbidity rates for the urban population. Among the rural population, stomach cancer and lung cancer shared first and second place; malignant neoplasms of the oral cavity and throat remained in eleventh place; breast cancer moved from fifth place to fourth; cervical cancer went from fourth to fifth; and lip cancer dropped from eight place to ninth, giving up its position to rectal cancer (Table 2). Stomach cancer remained in first place in five republics: RSFSR, BSSR, Azerbaijan, Kirghizia, and Tadzhikistan. Breast cancer occupies first place in the structure of the morbidity for the population of the Georgian SSR; esophageal cancer occupies that spot in the Turkmen SSR and the Uzbek SSR. The structural indices are roughly equal for stomach cancer and lung cancer in the RSFSR, Kazakhstan, and Lithuania and for stomach cancer and skin cancer in the Ukrainian SSR, Uzbekistan, Tadzhikistan, and Turkmenia. They are roughly equal for lung cancer and skin cancer and for stomach cancer and breast cancer in Moldavia (Table 3).

In the age structure of those afflicted, the percentage of elderly individuals is higher among women for all forms of tumors, except for breast cancer. Especially great are the differences between men and women in the median of the age distribution of patients (the age that divides the first-time diagnosed patients into two equal groups—one younger than the "median" age, the other older) with lip cancer (higher among women than among men by 18.5%), esophageal cancer (higher by 12.2%), and lung cancer (higher by 11.8%). The smallest differences exist with melanoma of the skin (higher among women by 3.0%) and rectal cancer (higher by 3.2%) (Table 4). The median of the age distribution of afflicted men is dropping (it was 61.8 in 1975, 60.32 in 1980, and 60.23 in 1985); among women, it is tending to grow (62.04, 61.73, and 62.76), i.e., males with malignant neoplasms are "getting younger," while females patients are "getting older," which is because of the more intense growth of morbidity among women 70 years of age or older and among men in a younger age group. The dynamics of the change in the age structure of the population, however, is such that the average annual rate of growth of morbidity is higher among men than among women not only at a younger age, but also in the older age groups: it is 2.6% among men in the 50-59 age group, and 0.3% among women of that age group; in the 70-or-older age group, those figures are 2.4% and 1.4%, respectively. In the 60-69 age group, the rate of growth is 1.1% among men, while it in fact drops among women to an average annual rate of 0.2%.

In the under-30 age group, the 1985 morbidity figures for men and women are at their closest point to each other;

(1) ТАБЛИЦА 1. *Заболеваемость населения СССР злокачественными новообразованиями в 1981—1985 гг.*

(5) Локализация опухоли	(2) Число больных с впервые в жизни установленным диагнозом злокачественной опухоли					(3) Частота заболеваемости на 100 000 населения										(4) Стандартизованные показатели*				
	1981	1982	1983	1984	1985	1981	1982	1983	1984	1985	1981	1982	1983	1984	1985	1981	1982	1983	1984	1985
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
(6) Губа (140)	13 586	13 847	13 479	12 980	13 428	2,4	2,4	2,3	2,2	2,2	5,1	5,0	5,0	4,7	4,8	4,2	4,1	4,0	3,8	4,0
(7) Полость рта, глотка (141—149)	8 880	9 591	10 480	11 104	12 584	1,6	1,7	1,8	1,9	2,0	3,3	3,6	3,8	4,0	4,5	2,8	3,0	3,2	3,4	3,9
(8) Пищевод (150)	16 747	16 791	17 247	16 979	17 682	3,0	3,0	2,9	2,8	2,9	6,3	6,2	6,3	6,2	6,4	5,0	5,0	5,0	4,9	5,1
(9) Желудок (151)	96 693	97 211	97 529	95 854	94 720	17,4	17,1	16,6	16,1	15,4	36,2	36,0	35,8	34,9	34,2	32,2	29,4	29,1	28,3	27,7
(10) Прямая кишка, ректосигмоидное соединение, анус (154)	22 320	23 482	24 501	25 147	26 633	4,0	4,1	4,2	4,2	4,3	8,3	8,7	9,0	9,2	9,6	6,9	7,2	7,4	7,4	7,8
(11) Гортань (161)	10 528	10 894	11 291	11 530	12 341	1,9	1,9	1,9	1,9	2,0	3,9	4,0	4,1	4,2	4,4	3,3	3,4	3,5	3,6	3,8
(12) Трахея, бронхи, легкие (162)	81 072	84 252	87 742	91 702	96 179	14,6	14,8	15,0	15,4	15,6	30,3	31,2	32,2	33,4	34,7	25,0	25,7	26,5	27,5	28,7
(13) Кожа (172, 173)	63 829	64 720	68 463	68 702	70 817	11,5	11,4	11,7	11,5	11,4	22,9	23,6	23,2	22,9	23,3	19,0	19,2	18,7	18,4	18,7
(14) Молочная железа (174, 175)	41 649	43 127	44 914	47 664	49 081	7,5	7,6	7,7	8,0	8,0	15,6	16,0	16,5	17,4	17,7	13,4	13,7	14,2	15,1	15,5
(15) Шейка матки (180)	29 247	28 009	27 295	26 192	26 199	5,3	4,9	4,6	4,4	4,2	10,9	10,4	10,0	9,8	9,4	9,4	8,9	8,6	8,2	8,1
(16) Лимфатическая и кроветворная ткань (200—208)	24 675	25 147	25 619	26 261	27 972	4,4	4,4	4,4	4,4	4,5	9,2	9,3	9,4	9,6	10,1	8,4	8,5	8,5	8,7	9,2
(17) Все злокачественные новообразования (140—208)	556 031	568 699	586 709	596 797	615 780	100,0	100,0	00,0	100,0	100,0	208,1	210,9	215,6	217,2	222,2	174,1	175,6	179,1	180,7	185,1

(18) * Здесь и в последующих таблицах использован стандарт M. Segi.

Key:—1. Table 1. Morbidity due to malignant neoplasms among the ussr population in 1981-1985—2. Number of patients with first-time diagnosis of malignant tumor—3. Frequency of morbidity per 100,000 population—4. Standardized indices*—5. Tumor site—6. Lip (140)—7. Oral cavity and throat (141-149)—8. Esophagus (150)—9. Stomach (151)—10. Rectum, rectosigmoid flexure, anus (154)—11. Pharynx (161)—12. Trachea, bronchi, lungs (162)—13. Skin (172, 173)—14. Breast (174, 175)—15. Cervix—16. Lymphatic and hemopoietic tissue (200-208)—17. All malignant neoplasms (140-208)—18. *Here and in subsequent tables, the M. Segi standard is used.

(1) ТАБЛИЦА 2. *Заболеваемость злокачественными новообразованиями населения в 1981—1985 гг. в зависимости от места жительства*

(4) Локализация опухоли	(2) Число больных с впервые в жизни установленным диагнозом злокачественной опухоли					(3) Частота заболеваемости на 100 000 населения									
	1981	1982	1983	1984	1985	1981	1982	1983	1984	1985	1981	1982	1983	1981	1985
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
(18) Городское население															
(5) Губа (140)	6 615	6 671	6 712	6 573	6 623	1,8	1,7	1,7	1,6	1,6	3,9	3,9	3,8	3,7	3,7
(6) Полость рта, глотка (141—149)	6 067	6 460	7 123	7 610	8 630	1,6	1,7	1,8	1,9	2,0	3,6	3,8	4,1	4,3	4,8
(7) Пищевод (150)	9 285	9 294	9 662	9 560	9 865	2,5	2,4	2,4	2,3	2,3	5,5	5,4	5,5	5,4	5,5
(8) Желудок (151)	63 270	63 569	63 719	63 236	62 319	16,8	16,5	16,0	15,5	14,8	37,4	36,9	36,4	35,6	34,6
(9) Прямая кишка, ректосигмоидное соединение, анус (154)	15 956	16 802	17 515	18 041	19 201	4,2	4,4	4,4	4,4	4,6	9,4	9,8	10,0	10,2	10,6
(10) Гортань (161)	6 861	7 127	7 416	7 556	8 056	1,8	1,8	1,9	1,8	1,9	4,0	4,1	4,2	4,2	4,5
(11) Трахея, бронхи, легкие (162)	54 102	56 398	58 409	61 007	63 665	14,4	14,6	14,7	14,9	15,2	32,0	32,8	33,4	34,3	35,3
(12) Меланома кожи (172)	43 054*	3 621	3 975	4 321	4 342	11,4	0,9	1,0	1,0	1,0	25,4*	2,1	2,3	2,4	2,4
(13) Другие злокачественные новообразования кожи (173)		40 572	43 072	43 101	44 242		10,5	10,8	10,6	10,5		23,6	24,6	24,3	24,5
(14) Молочная железа (174, 175)	31 663	32 732	34 282	36 688	37 678	8,4	8,5	8,6	9,0	9,0	18,7	19,0	19,6	20,6	20,9
(15) Шейка матки (180)	18 229	17 641	17 197	16 541	16 457	4,8	4,6	4,3	4,0	3,9	10,8	10,2	9,8	9,3	9,1
(16) Лимфатическая и кроветворная ткань (200—208)	16 894	17 297	17 639	18 069	19 402	4,5	4,5	4,4	4,4	4,6	10,0	10,0	10,1	10,2	10,8
(17) Все злокачественные новообразования (140—208)	375 712	385 088	398 335	408 186	420 131	100,0	100,0	100,0	100,0	100,0	222,1	223,8	227,7	229,7	232,9

Key:—1. Table 2. Morbidity due to malignant neoplasms among the population in 1981-1985 as a function of place of residence—2. Number of patients with first-time diagnosis of malignant tumor—3. Frequency of morbidity per 100,000 population—4. Tumor site—5. Lip (140)—6. Oral cavity and throat (141-149)—7. Esophagus (150)—8. Stomach (151)—9. Rectum, rectosigmoid flexure, anus (154)—10. Pharynx (161)—11. Trachea, bronchi, lungs (162)—12. Melanoma of the skin (172)—13. Other malignant neoplasms of the skin (173)—14. Breast (174, 175)—15. Cervix (180)—16. Lymphatic and hemopoietic tissue (200-208)—17. All malignant neoplasms (140-208)

(1) Продолжение табл. 2

(4) Локализация опухоли	(2) Число больных с впервые в жизни установленным диагнозом злокачественной опухоли					(3) Частота заболеваемости на 100 000 населения									
	1981	1982	1983	1984	1985	1981	1982	1983	1984	1985	1981	1982	1983	1984	1985
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
(18) Сельское население															
(5) Губа (140)	6 970	6 876	6 767	6 407	6 805	3,9	3,7	3,6	3,4	3,5	7,1	7,0	7,0	6,6	7,0
(6) Полость рта, глотка (141—149)	2 813	3 131	3 357	3 494	3 954	1,6	1,7	1,8	1,8	2,0	2,9	3,2	3,4	3,6	4,1
(7) Пищевод (150)	7 402	7 497	7 585	7 419	7 817	4,1	4,1	4,0	3,9	4,0	7,6	7,7	7,8	7,6	8,1
(8) Желудок (151)	33 423	33 042	33 810	32 618	32 401	18,5	18,3	17,9	17,3	16,6	34,0	34,4	34,8	33,6	33,5
(9) Прямая кишка, ректосигмоидное соединение, анус (154)	6 364	6 680	6 986	7 106	7 432	3,5	3,6	3,7	3,8	3,8	6,5	6,8	7,2	7,3	7,7
(10) Гортань (161)	3 667	3 767	3 875	3 972	4 285	2,0	2,0	2,0	2,1	2,2	3,7	3,9	4,0	4,1	4,4
(11) Трахея, бронхи, легкие (162)	26 970	27 854	29 333	30 695	32 514	11,6	15,0	15,6	16,3	16,6	27,5	28,5	30,2	31,6	33,6
(12) Меланома кожи (172)		1 236	1 321	1 423	1 336		0,7	0,7	0,8	0,7		1,3	1,4	1,5	1,4
(13) Другие злокачественные новообразования кожи (173)	20 775*	19 291	20 095	19 854	20 397	11,5*	10,5	10,7	10,5	10,4	21,2*	19,8	20,7	20,5	21,1
(14) Молочная железа (174, 175)	9 986	10 395	10 632	10 976	11 403	5,5	5,7	5,6	5,8	5,8	10,2	10,6	10,9	11,3	11,8
(15) Шейка матки (180)	11 018	10 368	10 098	9 651	9 742	6,1	5,6	5,4	5,1	5,0	11,2	10,6	10,4	10,0	10,1
(16) Лимфатическая и кроветворная ткань (200—208)	7 781	7 850	7 980	8 192	8 570	4,3	4,3	4,2	4,3	4,4	7,9	8,0	8,2	8,8	8,8
(17) Все злокачественные новообразования (140—208)	180 319	183 611	188 374	188 611	195 649	100,0	100,0	100,0	100,0	100,0	183,6	188,0	193,7	194,4	202,1

Key:—1. Table 2, continued—2. Number of Patients With First-Time Diagnosis of Malignant Tumor—3. Frequency of Morbidity per 100,000 Population—4. Tumor Site—5. Lip (140)—6. Oral cavity and throat (141-149)—7. Esophagus (150)—8. Stomach (151)—9. Rectum, rectosigmoid flexure, anus (154)—10. Pharynx (161)—11. Trachea, bronchi, lungs (162)—12. Melanoma of the skin (172)—13. Other malignant neoplasms of the skin (173)—14. Breast (174, 175)—15. Cervix (180)—16. Lymphatic and hemopoietic tissue (200-208)—17. All malignant neoplasms (140-208)

(1) ТАБЛИЦА 3. *Структура заболеваемости злокачественными новообразованиями населения СССР и союзных республик в 1985 г. (%)*

(2) Республики	(3) Губа (140)	(4) Полость рта, глотка (141—149)	(5) Пищевод (150)	(6) Желудок (151)	(7) Прямая кишка, ректосигмоидное соединение, анус (154)	(8) Гортань (161)	(9) Трахея, бронхи, легкие (162)	(10) Кожа (172, 173)	(11) Молочная железа (174, 175)	(12) Шейка матки (180)	(13) Прочие органы	(14) Лимфатическая и кроветворная ткань (200-208)
1	2	3	4	5	6	7	8	9	10	11	12	13
(15) РСФСР	2,2	2,0	2,4	16,8	4,4	2,0	16,4	11,0	7,9	4,2	26,6	4,1
(16) Украинская ССР	2,5	2,0	1,3	13,0	4,7	1,9	15,8	12,5	8,1	4,2	29,1	4,9
(17) Белорусская ССР	1,8	1,9	1,2	17,5	4,8	2,1	14,6	11,0	7,7	3,8	28,3	5,3
(18) Узбекская ССР	1,4	3,4	13,8	12,9	2,7	1,5	9,1	12,3	6,8	4,8	25,8	5,4
(19) Казахская ССР	2,4	2,0	9,9	14,5	3,2	1,8	14,7	11,8	6,4	4,8	24,8	3,6
(20) Грузинская ССР	1,5	2,3	1,0	9,8	3,6	3,7	13,0	11,0	14,8	5,3	27,8	6,2
(21) Азербайджанская ССР	1,3	2,1	6,8	15,7	3,0	3,2	13,0	8,4	9,1	3,5	27,4	6,4
(22) Литовская ССР	1,3	1,8	1,1	13,8	5,0	2,1	14,1	10,4	7,9	3,8	32,7	6,0
(23) Молдавская ССР	2,8	2,6	1,3	9,6	5,0	1,6	14,4	14,8	9,8	6,3	26,3	5,6
(24) Латвийская ССР	1,0	1,5	1,1	12,0	4,1	2,1	15,0	11,2	9,0	3,2	33,5	6,0
(25) Киргизская ССР	1,8	1,7	5,8	17,4	2,7	1,6	12,0	13,2	7,1	5,9	26,5	4,3
(26) Таджикская ССР	1,9	2,0	9,5	16,7	3,1	1,5	8,2	16,6	5,4	3,9	23,3	7,8
(27) Армянская ССР	0,8	1,4	1,4	11,4	3,4	3,0	14,0	8,0	10,3	3,8	34,0	8,5
(28) Туркменская ССР	1,3	2,9	26,6	11,0	2,3	2,1	7,9	10,5	4,8	4,9	19,4	6,3
(29) Эстонская ССР	0,8	2,2	1,2	12,7	5,0	1,7	14,1	10,8	8,8	3,5	33,5	5,7
(30) СССР (в целом)	2,2	2,0	2,9	15,4	4,3	2,0	15,6	11,4	8,0	4,2	27,4	4,5

Key:—1. Table 3. Structure of morbidity due to malignant neoplasms among the population of the USSR and the Union republics in 1985 (in %)—2. Republic—3. Lip (140)—4. Oral cavity and throat (141-149)—5. Esophagus (150)—6. Stomach (151)—7. Rectum, rectosigmoid flexure, anus (154)—8. Pharynx (161)—9. Trachea, bronchi, lungs (162)—10. Skin (172)—11. Breast (174, 175)—12. Cervix (180)—13. Other organs—14. Lymphatic and hemopoietic tissue (200-208)—15. RSFSR—16. UkSSR—17. BSSR—18. UzSSR—19. KaSSR—20. GSSR—21. AzSSR—22. LiSSR—23. MSSR—24. LaSSR—25. KiSSR—26. TaSSR—27. ArSSR—28. TuSSR—29. ESSR—30. USSR as a whole

in the 30-39 group, they are considerably higher for women. In the 40-49 group, the frequency indices for morbidity are higher for men than for women in the RSFSR, the Ukrainian SSR, the BSSR, and Kazakhstan; in the 50-59 group, they are higher for men than for women in all the remaining Union republics (Table 5).

The standardized indices for morbidity among individuals of both sexes grew over the five-year period on average for the country (the average annual growth rate was 2.1% among men and 0.9% among women) and for most of the Union republics. Something of a reduction in the level of morbidity took place in the Kazakh and Turkmen Union republics as a result of a drop in the indices for the senior age groups (see Table 5).

(1) ТАБЛИЦА 4. *Медиана возрастного распределения больных со злокачественными новообразованиями в СССР, 1985 г.*

(2) Локализация опухоли	(3) Медиана		(6) $\frac{\text{гр. 3} - \text{гр. 2}}{\text{гр. 2}} \times 100$
	(4) мужчины	(5) женщины	
(7) Все злокачественные новообразования	60,2	62,8	4,3
В том числе:			
(8) полости рта и глотки	56,2	62,2	10,7
(9) губы	59,4	70,4	18,5
(10) пищевода	62,2	69,8	12,2
(11) желудка	60,9	67,7	11,2
(12) прямой кишки, ректосигмоидного соединения, ануса	63,4	65,4	3,2
(13) гортани	56,8	61,6	8,4
(14) трахеи, бронхов, легких	60,1	67,2	11,8
(15) кожи (меланома)	52,7	54,3	3,0
(16) кожи (другие злокачественные новообразования)	63,3	67,2	6,2
(17) молочной железы	60,8	55,8	—8,2
(18) шейки матки	—	59,2	—
(19) лимфатической и кроветворной ткани	52,3	54,9	5,0

Key: 1. Table 4. Median of age distribution of patients with malignant neoplasms in USSR, 1985—2. Tumor site—3. Median—4. Men—5. Women—6. [(Gr. 3 - Gr. 2)/Gr. 2] x 100—7. All malignant neoplasms—8. Oral cavity, throat—9. Lip—10. Esophagus—11. Stomach—12. Rectum, rectosigmoid flexure, anus—13. Pharynx—14. Trachea, bronchi, lungs—15. Skin (melanoma)—16. Skin (other malignant neoplasms)—17. Breast—18. Cervix—19. Lymphatic and hemopoietic tissue

The rate of growth of the standardized indices for morbidity due to malignant neoplasms was severalfold higher in 1981-1985 than in the preceding five-year period. With the observed growth of standardized morbidity indices on the whole for all forms of malignant neoplasms, the drop continues for morbidity due to stomach and lip cancer for individuals of both sexes and for cervical and esophageal cancer among women. However, this process is proceeding at a slower rate in the second five-year period than in 1976-1980. On the other hand, the growth in morbidity due to malignant neoplasms of the rectum, lungs, skin, mammary glands, and lymphatic and hemopoietic tissue was considerably more intense in 1981-1985 than in the preceding five-year period (Figure 1).

Morbidity due to malignant neoplasms in 1985 involved 233.1 men per 100,000 population and 212.5 women per 100,000 population (the standardized indices were 246.7 and 154.5). The highest level of morbidity in the standardized indices (see Table 5) was noted in Estonia (278.1 and 186.2); the lowest was in Georgia (127.9 and 99.4). Differences in frequency of individual forms of tumors and frequency of their morphological variations between men and women and urban and rural resident can be seen in various populations even when levels of overall morbidity are equal. In dynamics, they vary depending on the appearance of new epidemiological factors or depending on the change in the intensity of action of existing epidemiological factors. Especially striking in some republics are the differences between the frequencies of esophageal cancer and stomach cancer, as well as between the frequencies of esophageal cancer and rectal cancers (Table 6). For example, if in the Turkmen SSR there are 47.2 men with stomach cancer for every 100 men afflicted with esophageal cancer and there are 34.0 women with stomach cancer for every 100 women with esophageal cancer, then in BSSR those same figures are 1016.3 and 4825.0, respectively. The differences are considerable in the correlations between malignant neoplasms of the oral cavity and throat and lip cancer: 33.7 in the Estonian SSR versus 137.3 in the Kazakh SSR among men, and 23.5 in Estonia versus 108.3 in Moldavia among women. Similar correlations undergo substantial changes in dynamics in a number of cases. For example, in 1975, there were 47.3 breast cancer patients for every 100 cervical cancer patients in the Turkmen SSR; in 1980, the figure was 74.2; in 1985, it was 97.8 (those were the smallest differences among the Union republics). In the Latvian SSR, those figures were 119.0, 203.5, and 299.1 (the greatest differences among the Union republics). A study of the dynamics of the correlations between individuals of opposite sex in terms of frequency of malignant neoplasms (Table 7) showed that, on the whole, for all forms of tumors, the differences increased considerably in terms of the levels of morbidity among men and women in Kirghizia (to 145 from 109); with malignant

(1) ТАБЛИЦА 5. *Возрастно-половые показатели заболеваемости злокачественными новообразованиями (140—208) населения СССР и союзных республик в 1981—1985 гг.*

(7) Республики	(8) Годы	(2) Число больных с впервые в жизни установленным диагнозом злокачественного новообразования на 100 000 населения соответствующего пола и возраста															
		(3) Мужчины								(4) Женщины							
		(9) До 30 лет	(10) 30—39 лет	(11) 40—49 лет	(12) 50—59 лет	(13) 60—69 лет	(14) 70 и более лет	(5) Всего (15) обычный показатель	(5) Всего (16) стандартизованный показатель	(9) До 30 лет	(10) 30—39 лет	(11) 40—49 лет	(12) 50—59 лет	(13) 60—69 лет	(14) 70 и более лет	(6) Всего (15) обычный показатель	(6) Всего (16) стандартизованный показатель
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
(17) СССР в целом	1981	11,9	53,0	206,5	600,3	1197,2	1423,9	211,8	227,0	13,3	79,3	204,2	404,0	655,8	702,2	204,6	149,1
	1982	12,3	50,5	205,2	611,9	1211,6	1452,8	215,5	229,8	13,1	77,0	206,5	405,5	651,0	723,5	206,8	149,6
	1983	12,0	52,2	215,2	630,0	1220,6	1508,9	221,6	235,7	13,3	79,8	215,5	408,7	651,1	719,8	210,2	152,1
	1984	12,3	52,8	226,6	644,4	1207,6	1527,2	225,0	238,5	13,5	80,9	220,5	406,6	645,4	741,4	210,5	152,6
	1985	12,5	53,6	240,2	664,5	1252,6	1568,6	233,1	246,7	13,8	83,2	227,4	409,3	649,4	743,4	212,5	154,5
(18) РСФСР	1981	12,5	53,2	218,7	646,2	1279,5	1629,3	237,1	246,7	14,8	82,8	209,5	409,8	682,6	767,0	230,4	155,9
	1982	12,9	50,8	220,7	658,4	1307,8	1639,1	242,3	250,1	14,4	79,3	214,0	413,7	673,1	781,0	232,4	156,1
	1983	12,4	52,7	229,4	679,5	1336,0	1694,1	250,0	257,1	14,7	82,8	221,7	418,5	680,8	790,0	236,5	159,0
	1984	12,9	52,7	238,2	695,8	1296,9	1679,7	251,5	256,9	15,1	83,1	225,8	410,1	660,8	787,6	234,4	157,6
	1985	12,9	54,0	253,9	711,0	1347,7	1708,6	260,3	264,6	15,1	86,0	235,6	409,8	663,5	784,0	236,2	159,2
(19) УССР	1981	14,6	61,5	221,0	617,5	1210,0	1357,5	258,7	230,9	16,1	85,2	222,5	429,6	663,1	641,2	236,3	153,8
	1982	15,0	58,8	214,0	622,9	1229,8	1432,3	264,1	234,8	16,1	84,9	222,0	428,8	666,9	681,1	241,2	155,5
	1983	15,2	60,4	231,7	648,6	1214,3	1491,0	273,0	241,0	16,2	89,2	229,1	434,3	658,7	710,2	246,5	158,2
	1984	14,8	60,9	250,7	680,6	1250,4	1554,7	285,0	250,9	15,8	90,2	238,0	446,6	686,6	724,2	253,4	162,6
	1985	15,1	61,3	263,6	710,0	1302,6	1626,9	297,9	261,6	17,2	91,0	239,5	456,7	682,1	737,2	256,6	164,8
(20) БССР	1981	12,2	45,9	186,9	522,5	1053,8	1198,8	203,2	198,4	13,7	73,6	!82,1	370,3	582,1	573,5	188,9	132,9
	1982	13,7	43,3	196,0	541,8	1056,0	1283,5	212,4	205,5	13,6	74,2	181,2	366,9	614,0	584,3	192,3	134,9
	1983	12,5	44,5	196,4	574,8	1059,2	1310,3	218,8	209,3	14,1	76,2	195,8	364,1	590,1	612,0	196,1	136,6
	1984	12,5	45,0	209,6	567,1	1081,0	1400,9	224,9	215,4	11,9	81,0	206,1	377,9	584,7	639,8	200,9	139,4
	1985	13,1	48,2	219,6	502,8	1164,9	1335,8	231,1	222,2	16,1	77,6	204,3	366,2	604,6	625,8	200,6	140,6

Key: 1. Age-sex indices for morbidity due to malignant neoplasms (140-208) among the population of the USSR and the Union republics in 1981-1985—2. Number of patients with first-time diagnosis of malignant neoplasm per 100,000 population in terms of age and sex—3. Men—4. Women—5. Total—6. Total—7.Republic—8. Year—9. Under 30 years of age—10. 30-39—11. 40-49—12. 50-59—13. 60-69—14. 70 or older—15. Unadjusted index—16. Standardized index—17. USSR as a whole—18. RSFSR—19. UkSSR—20. BSSR

(1) Продолжение табл. 5

(7) Республики	(8) Годы	(2) Число больных с впервые в жизни установленным диагнозом злокачественного новообразования на 100 000 населения соответствующего пола и возраста															
		(3) Мужчины								(4) Женщины							
		(9) До 30 лет	(10) 30—39 лет	(11) 40—49 лет	(12) 50—59 лет	(13) 60—69 лет	(14) 70 и более лет	(5) Всего: (15) обычный показатель	(5) Всего: (16) стандартизованный показатель	(9) До 30 лет	(10) 30—39 лет	(11) 40—49 лет	(12) 50—59 лет	(13) 60—69 лет	(14) 70 и более лет	(6) Всего: (15) обычный показатель	(6) Всего: (16) стандартизованный показатель
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
(17) Узбекская ССР	1981	7,8	33,2	117,2	304,5	695,7	726,8	72,5	124,1	6,4	50,9	122,2	265,0	432,8	399,0	71,3	92,5
	1982	7,3	33,8	105,9	302,0	699,6	701,9	70,1	121,5	6,5	45,6	132,6	256,7	405,6	388,7	69,6	90,2
	1983	8,3	38,0	120,2	344,3	758,1	765,8	77,4	134,5	7,7	52,4	166,1	290,4	447,1	425,5	78,5	103,0
	1984	9,3	45,9	142,1	327,2	627,5	748,6	75,3	128,3	8,9	55,9	159,1	295,4	427,5	402,7	76,7	101,5
	1985	9,7	45,7	140,2	355,7	684,4	871,7	80,6	139,6	7,6	57,9	170,3	291,1	486,2	462,7	80,3	108,2
(18) Казахская ССР	1981	9,8	50,5	217,9	684,7	1310,1	1534,1	167,6	246,1	10,5	70,0	200,4	458,4	770,8	791,2	164,2	161,7
	1982	11,2	45,9	221,1	700,4	1315,0	1494,0	170,1	246,6	11,4	65,2	202,5	448,1	747,6	796,4	163,8	159,6
	1983	10,0	47,1	219,8	699,1	1242,2	1489,0	166,8	240,9	11,3	69,4	204,6	439,3	717,1	798,8	162,7	157,8
	1984	9,1	50,3	227,1	690,8	1281,2	1471,1	168,4	242,8	10,7	73,3	206,7	426,5	684,6	754,5	158,8	153,2
	1985	9,9	48,9	234,3	696,5	1247,6	1522,8	171,9	244,6	11,0	76,7	209,6	438,9	685,6	746,9	162,0	155,0
(19) Грузинская ССР	1981	11,2	40,6	106,6	293,6	624,1	702,1	118,7	119,2	11,8	62,3	169,1	307,6	375,6	329,0	127,1	99,9
	1982	10,1	35,8	109,7	332,7	616,2	636,9	120,0	118,6	11,6	64,0	159,4	278,4	383,3	353,8	125,6	97,8
	1983	9,8	36,4	104,5	312,1	608,7	689,0	119,9	117,8	9,2	62,3	150,4	274,6	379,3	342,9	122,3	94,1
	1984	12,2	37,2	122,4	334,3	612,2	729,2	129,3	125,3	8,4	64,1	166,6	294,4	380,3	378,3	130,8	99,1
	1985	12,6	39,1	124,1	329,4	668,9	701,6	132,4	127,9	9,7	61,9	158,2	298,1	393,0	370,6	130,7	99,4
(20) Азербайджанская ССР	1981	8,9	56,0	167,7	399,8	988,0	919,9	105,4	168,7	8,8	78,2	157,8	287,0	450,2	367,3	89,7	103,2
	1982	9,3	38,5	135,2	415,8	890,2	1107,2	104,6	166,0	8,0	61,7	131,4	298,9	467,6	568,4	96,2	108,3
	1983	9,0	46,5	152,9	407,2	850,0	1021,9	103,7	162,1	6,2	58,6	154,6	272,2	416,1	486,3	89,6	100,6
	1984	7,7	52,7	153,8	400,7	837,0	964,0	101,8	158,5	8,0	59,9	148,5	281,5	455,2	498,4	93,4	104,8
	1985	7,9	61,7	148,1	430,3	857,0	1089,2	109,1	168,3	7,3	63,5	158,2	273,5	442,0	475,0	92,0	103,5

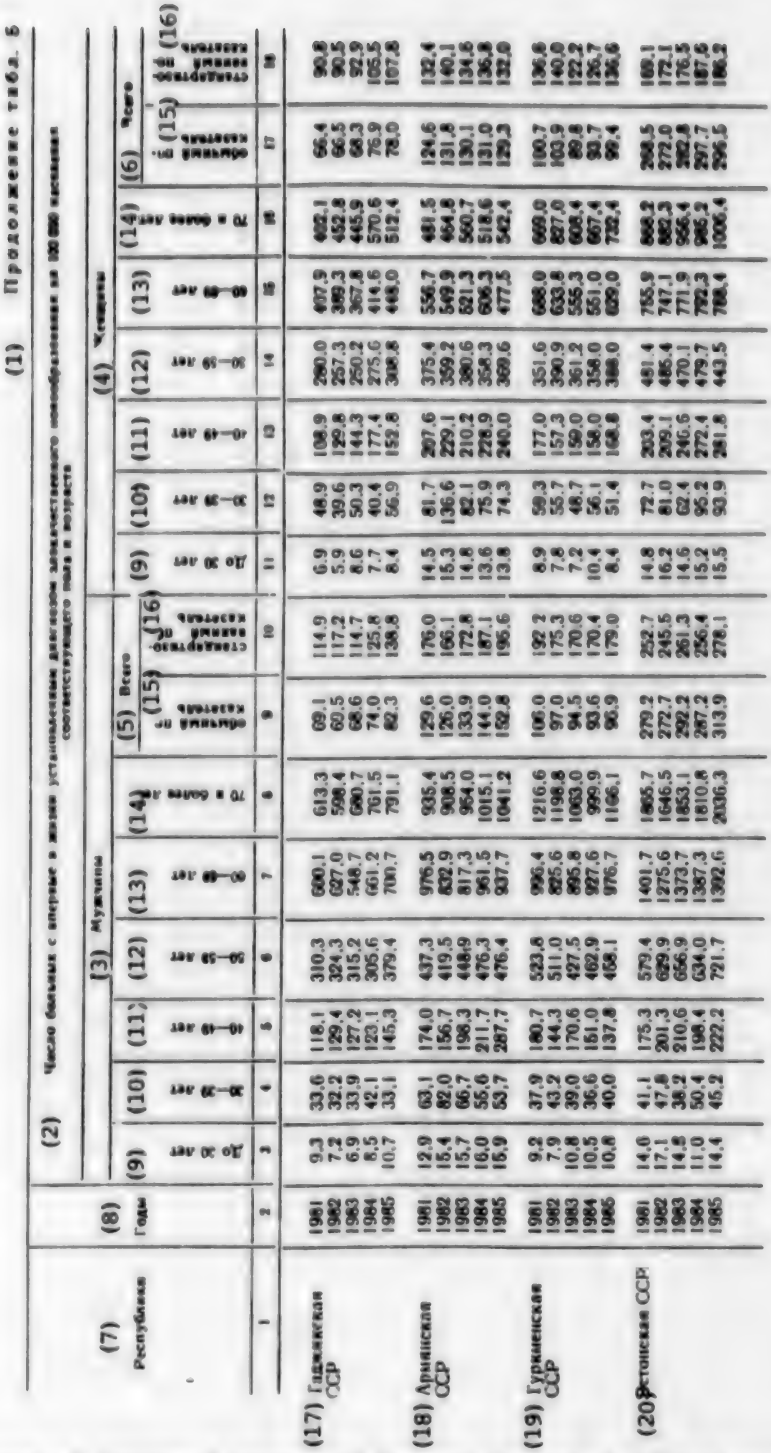
Key: 1. Table 5, continued—2. Number of patients with first-time diagnosis of malignant neoplasm per 100,000 population in terms of age and sex—3. Men—4. Women—5. Total—6. Total—7. Republic—8. Year—9. Under 30 years of age—10. 30-39—11. 40-49—12. 50-59—13. 60-69—14. 70 or older—15. Unadjusted index—16. Standardized index—17. UzSSR—18. KaSSR—19. GSSR—20. AzSSR

(1) Продолжение табл 5

(2) Число больных с впервые установленным диагнозом злокачественного новообразования на 100 тыс населения соответствующего пола и возраста

(7) Республика	(8) Годы	(3) Мужчины						(4) Женщины						(5) Всего		(6) Всего	
		(9) До 30 лет	(10) 30—39 лет	(11) 40—49 лет	(12) 50—59 лет	(13) 60—69 лет	(14) 70 и более лет	(9) До 30 лет	(10) 30—39 лет	(11) 40—49 лет	(12) 50—59 лет	(13) 60—69 лет	(14) 70 и более лет	(15) Нестандартизованный показатель	(16) Стандартизованный (по возрасту) показатель	(15) Нестандартизованный показатель	(16) Стандартизованный (по возрасту) показатель
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
(17) Литовская ССР	1981	10,9	51,9	207,0	534,4	1170,4	1707,5	15,6	77,9	212,3	425,2	698,6	919,7	260,0	230,7	231,8	160,1
	1982	12,7	56,3	198,4	598,7	1161,4	1663,0	18,0	90,9	221,1	419,9	684,1	887,8	263,8	234,6	241,8	160,0
	1983	14,0	57,7	204,8	556,6	1243,2	1853,0	13,2	90,3	234,8	447,9	714,1	926,1	277,3	245,6	249,4	171,2
	1984	13,0	59,1	210,1	606,6	1166,3	1936,7	14,5	93,5	244,9	458,3	723,9	921,5	284,5	249,3	255,4	174,8
	1985	17,8	56,2	222,2	646,6	1251,0	1918,6	17,0	94,4	257,0	499,1	683,2	901,0	295,7	261,0	254,7	174,5
(18) Молдавская ССР	1981	12,3	63,2	161,1	448,5	829,4	873,5	13,1	79,2	204,0	366,9	569,6	485,5	154,8	163,3	148,4	127,4
	1982	14,3	62,0	156,7	508,7	891,8	963,3	13,4	70,6	213,4	380,9	553,5	542,1	166,6	174,1	155,6	132,1
	1983	11,5	57,1	168,2	514,2	834,6	1002,3	12,6	82,8	216,3	355,5	532,8	570,4	167,8	174,5	157,3	133,0
	1984	11,9	48,4	174,1	497,0	857,6	1042,7	14,0	92,6	211,7	370,7	546,0	586,3	167,9	175,9	162,0	137,4
	1985	12,3	50,7	220,6	572,1	883,4	1061,9	14,5	103,1	243,6	403,1	575,9	594,2	182,2	191,8	172,9	148,6
(19) Латвийская ССР	1981	11,2	39,0	161,9	574,4	1066,3	1462,0	12,3	69,7	221,9	438,6	674,8	771,2	247,7	210,6	251,2	156,6
	1982	12,3	44,1	160,3	537,3	1094,3	1543,1	13,4	73,0	192,6	433,5	652,1	794,4	251,0	213,5	244,8	153,2
	1983	13,3	49,7	166,8	561,4	1068,7	1657,2	15,2	76,0	234,2	404,9	650,1	768,9	262,3	222,4	249,6	155,6
	1984	12,8	42,5	195,7	592,7	1215,3	1768,6	14,3	70,7	224,8	436,5	682,7	897,0	281,3	239,8	267,1	162,9
	1985	14,5	38,7	196,6	619,1	1184,0	1880,6	16,6	86,5	222,9	424,7	735,8	874,4	276,8	237,4	272,0	168,2
(20) Киргизская ССР	1981	8,9	61,6	174,5	470,8	1009,9	956,7	8,3	65,4	175,0	304,8	537,1	531,2	116,2	179,5	107,5	117,5
	1982	9,2	59,4	172,6	471,7	871,4	1055,9	8,5	77,8	174,5	371,4	562,8	583,9	115,1	174,8	114,7	124,0
	1983	8,3	46,1	170,0	470,7	900,1	1000,9	8,2	82,0	196,9	371,5	551,9	549,4	113,7	175,4	115,9	127,2
	1984	9,2	47,8	180,2	433,8	924,3	1109,8	9,0	61,1	163,4	294,4	487,1	478,7	112,6	176,4	98,8	109,6
	1985	6,9	46,0	172,3	460,6	880,7	1008,8	8,5	59,3	175,8	352,4	562,2	587,9	108,7	172,0	112,0	125,1

Key: 1. Table 5, continued—2. Number of patients with first-time diagnosis of malignant neoplasm per 100,000 population in terms of age and sex—3. Men—4. Women—5. Total—6. Total—7. Republic—8. Year—9. Under 30 years of age—10. 30-39—11. 40-49—12. 50-59—13. 60-69—14. 70 or older—15. Unadjusted index—16. Standardized index—17. LiSSR—18. MSSR—19. LaSSR—20. KiSSR

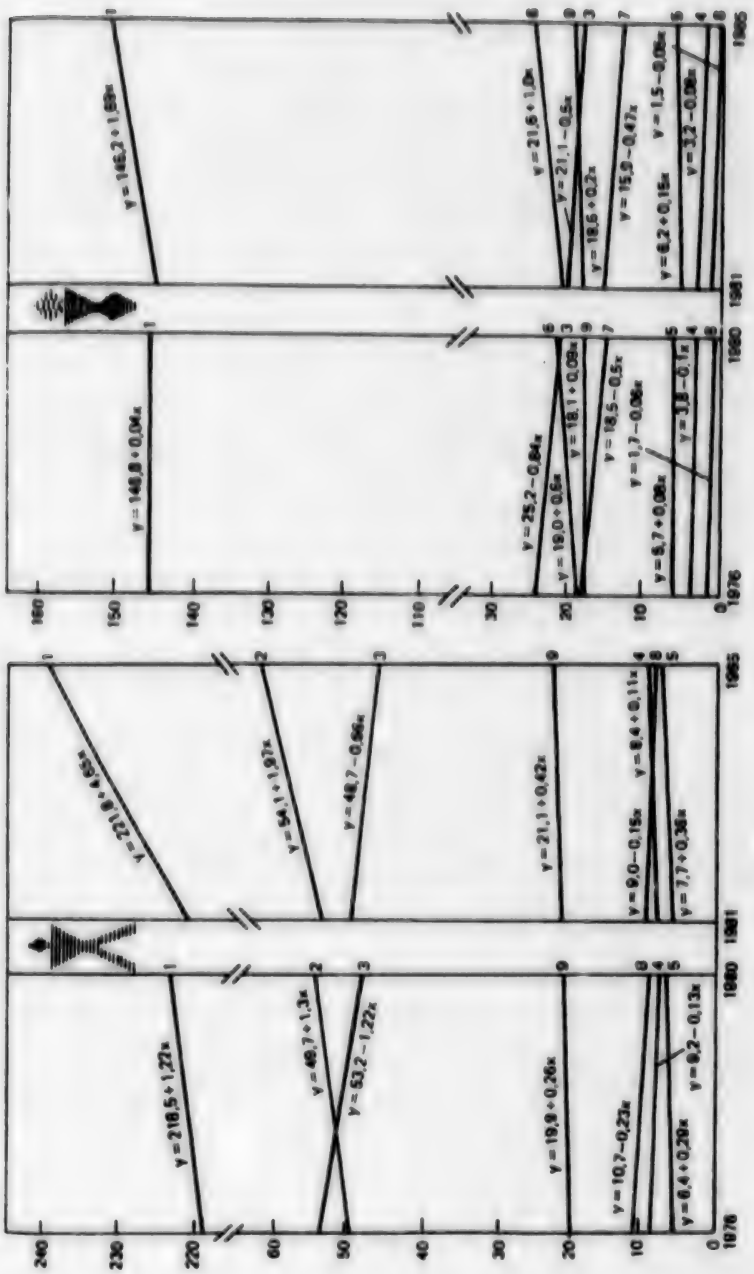


(1) Продолжение табл. 5

(2) Число больных с впервые в жизни установленным диагнозом злокачественного новообразования на 100 000 населения соответствующего пола и возраста

(7) Республика	(8) Годы	(3) Мужчины							(4) Женщины							
		(9) До 30 лет	(10) 30—39 лет	(11) 40—49 лет	(12) 50—59 лет	(13) 60—69 лет	(14) 70 и более лет	(5) Всего (15) обычный показатель	стандартизованный показатель (16)	(9) До 30 лет	(10) 30—39 лет	(11) 40—49 лет	(12) 50—59 лет	(13) 60—69 лет	(14) 70 и более лет	(6) Всего (15) обычный показатель	стандартизованный показатель (16)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
(17) Таджикская ССР	1981	9,3	33,6	118,1	310,3	600,1	613,3	69,1	114,9	6,9	48,9	108,9	280,0	497,9	482,1	66,4	90,8
	1982	7,2	32,2	129,4	324,3	627,0	598,4	60,5	117,2	5,9	39,6	129,8	257,3	399,3	452,8	66,5	90,5
	1983	6,9	33,9	127,2	315,2	548,7	680,7	68,6	114,7	8,6	50,3	144,3	250,2	367,8	445,9	68,3	92,9
	1984	8,5	42,1	123,1	305,6	661,2	701,5	74,0	125,8	7,7	40,4	177,4	275,6	414,6	570,6	76,9	105,5
	1985	10,7	33,1	145,3	379,4	700,7	791,1	82,3	138,8	8,4	56,9	152,8	306,8	448,0	512,4	78,0	107,8
(18) Армянская ССР	1981	12,9	63,1	174,0	437,3	976,5	935,4	129,6	176,0	14,5	81,7	207,6	375,4	556,7	481,5	124,6	132,4
	1982	15,4	82,0	156,7	419,5	832,9	908,5	126,0	166,1	15,3	136,6	229,1	359,2	549,9	464,8	131,8	140,1
	1983	15,7	66,7	198,3	448,9	817,3	954,0	133,9	172,8	14,8	82,1	210,2	380,6	521,3	560,7	130,1	134,6
	1984	16,0	55,6	211,7	476,3	961,5	1015,1	144,0	187,1	13,6	75,9	228,9	358,3	606,3	518,6	131,0	136,8
	1985	15,9	53,7	287,7	476,4	937,7	1041,2	152,8	196,6	13,8	74,3	240,0	369,6	477,5	542,4	129,3	132,0
(19) Туркменская ССР	1981	9,2	37,9	160,7	523,8	996,4	1216,6	106,0	192,2	8,9	59,3	177,0	351,6	668,0	669,0	100,7	126,6
	1982	7,9	43,2	144,3	511,0	825,6	1198,8	97,0	175,3	7,8	55,7	157,3	390,9	633,8	827,0	103,9	140,0
	1983	10,8	39,0	170,6	427,5	895,8	1063,0	94,5	170,6	7,2	46,7	190,0	361,2	555,3	608,4	89,8	122,2
	1984	10,5	36,6	161,0	462,9	927,6	999,9	93,6	170,4	10,4	56,1	158,0	358,0	551,0	667,4	93,7	126,7
	1985	10,8	40,0	137,8	458,1	976,7	1166,1	90,9	179,0	8,4	51,4	168,8	388,0	629,0	732,4	99,4	136,6
(20) Эстонская ССР	1981	14,0	41,1	175,3	579,4	1401,7	1865,7	279,2	252,7	14,8	72,7	203,4	491,4	755,9	868,2	298,5	168,1
	1982	17,1	47,8	201,3	629,9	1275,6	1646,5	272,7	245,5	16,2	81,0	209,1	485,4	747,1	882,3	272,0	172,1
	1983	14,8	38,2	210,6	656,9	1373,7	1853,1	292,2	261,3	14,6	82,4	240,6	470,1	771,9	956,4	282,8	176,5
	1984	11,0	50,4	198,4	634,0	1387,3	1810,8	287,2	256,4	15,2	95,2	272,4	479,7	792,3	985,2	297,7	187,8
	1985	14,4	45,2	222,2	721,7	1392,6	2036,3	313,9	278,1	15,5	93,9	281,8	443,5	788,4	1006,4	296,5	186,2

Key: 1. Table 5, continued—2. Number of patients with first-time diagnosis of malignant neoplasm per 100,000 population in terms of age and sex—3. Men—4. Women—5. Total—6. Total—7.Republic—8. Year—9. Under 30 years of age—10. 30-39—11. 40-49—12. 50-59—13. 60-69—14. 70 or older—15. Unadjusted index—16. Standardized index—17. TaSSR—18. ArSSR—19. TuSSR—20. ESSR



Dynamics of morbidity due to malignant neoplasms (standardized indices per 100,000) among the USSR population for 1976-1985

Key: 1. All malignant neoplasms—2. Lung cancer—3. Stomach cancer—4. Esophageal cancer—5. Rectal cancer—6. Breast cancer—7. Cervical cancer—8. Lip cancer—9. Malignant neoplasms of the skin

neoplasms or the oral cavity and throat, those figures were 545 and 331 in Estonia, 506 and 382 in the Ukraine, and 326 and 252 in Kazakhstan. For esophageal neoplasms, the figures were 760 and 614 for BSSR, 688 and 562 for the Ukraine, and 580 and 324 for Moldavia. For stomach neoplasms, the figures were 270 and 197 in Kirghizia; for lung neoplasms, they were 716 and 454 in Kirghizia, 997 and 885 in BSSR, 773 and 662 in Georgia, and 573 and 442 in Turkmenia. The figure for skin neoplasms in Moldavia jumped to 141 from 105. A marked reduction in the differences between morbidity for men and for women in terms of malignant

(1) ТАБЛИЦА 6. *Соотношение стандартизованных показателей заболеваемости между основными формами злокачественных новообразований населения СССР в 1985 г.**

(12) Республики	(2) Полость рта, глотка / Губа		(3) Кожа / Губа		(4) Пищевод / Желудок		(5) Пищевод / Прямая кишка, ректосигмоидное соединение, анус		(6) Желудок / Прямая кишка		(7) Гортань, / Трахея, бронхи, легкие		(8) Шейка матки / Молочная железа	(9) Меланома кожи / Другие новообразования кожи	
	(10) мужчины	(11) женщины	(10) мужчины	(11) женщины	(10) мужчины	(11) женщины	(10) мужчины	(11) женщины	(10) мужчины	(11) женщины	(10) мужчины	(11) женщины	(11) женщины	(10) мужчины	(11) женщины
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
(13) РСФСР	117,9	81,2	39,6	6,6	572,4	1060,0	116,1	375,0	20,3	35,4	755,6	1925,0	196,4	1170	776
(14) УССР	118,3	106,7	35,0	7,5	729,6	2012,5	211,1	937,5	28,9	46,6	648,5	3000,0	196,4	1321	840
(15) БССР	101,6	57,1	32,5	4,5	1016,3	4825,0	230,2	1600,0	22,6	33,2	606,7	2750,0	209,6	1220	842
(16) Узбекская ССР	51,7	28,6	18,2	5,8	108,8	78,9	15,3	24,2	14,8	30,7	597,0	509,4	140,7	2254	1615
(17) Казахская ССР	137,3	70,0	39,5	6,6	169,9	119,4	25,8	40,3	15,2	33,7	789,5	1950,0	134,8	3007	2153
(18) Грузинская ССР	80,0	35,7	21,9	5,0	709,5	1420,0	219,0	600,0	30,9	46,5	318,5	900,0	276,5	2069	1108
(19) Азербайджанская ССР	78,6	26,7	22,9	4,8	265,1	185,1	37,3	52,2	14,1	28,2	396,6	587,5	256,8	1654	1627
(20) Литовская ССР	73,0	50,0	24,8	2,9	866,7	2350,0	262,5	1012,5	30,3	43,1	591,3	1775,0	209,6	1103	654
(21) Молдавская ССР	107,2	108,3	33,7	5,7	652,8	1111,1	272,7	800,0	41,7	72,0	777,2	2050,0	154,2	1269	917
(22) Латвийская ССР	62,7	53,8	17,2	3,5	886,8	1711,1	242,1	733,3	27,3	42,8	662,1	1000,0	299,1	1150	488
(23) Киргизская ССР	117,0	83,3	25,3	5,3	309,4	279,6	33,6	68,5	10,8	24,5	702,0	1060,0	126,5	2011	1354
(24) Таджикская ССР	120,6	62,5	19,8	4,8	192,5	155,7	24,2	40,9	12,6	26,3	575,0	557,1	113,8	3245	1711
(25) Армянская ССР	54,8	71,4	14,4	4,7	913,3	638,9	196,7	288,9	21,5	45,2	417,8	928,6	258,6	1130	714
(26) Туркменская ССР	47,4	40,9	21,0	5,6	47,2	34,0	9,0	7,4	19,0	21,9	368,2	450,0	97,8	5094	5096
(27) Эстонская ССР	33,7	23,5	13,3	1,9	721,6	2266,7	272,5	944,4	37,8	41,7	712,8	2733,3	268,2	1308	723
(28) СССР в целом	113,5	81,5	36,0	6,7	476,9	664,3	105,5	250,0	22,1	37,6	707,7	1900,0	192,8	1329	858

(29) * Заболеваемость формой опухоли, приведенной в числителе, принята за 100.

Key: 1. Table 6. Correlation of standardized indices of morbidity among basic forms of malignant neoplasms in USSR population in 1985*—2. Oral cavity, throat/Lip—3. Skin/Lip—4. Esophagus/Stomach—5. Esophagus/Rectum, rectosigmoid flexure, anus—6. Stomach/Rectum—7. Pharynx/Trachea, bronchi, lungs—8. Cervix/ Breast—9. Skin melanoma/Other skin neoplasms—10. Men—11. Women—12. Republic—13. RSFSR—14. UkSSR—15. BSSR—16. UzSSR—17. KaSSR—18. GSSR—19. AzSSR—20. LiSSR—21. MSSR—22. LaSSR—23. KiSSR—24. TaSSR—25. ArSSR—26. TuSSR—27. ESSR—28. USSR as a whole—29. *Morbidity due to the tumor form listed in the numerator is taken as 100.

(1) ТАБЛИЦА 7. *Соотношение стандартизованных показателей заболеваемости злокачественными новообразованиями мужчин и женщин в 1980—1985 гг*.*

(11) Республики	(2) Все злокачественные новообразования (140—208)		(3) Полость рта, глотка (141—149)		(4) Пищевод (150)		(5) Желудок (151)		(6) Прямая кишка, ректосигмоидное соединение, анус (154)		(7) Трахея, бронхи, легкие (162)		(8) Кожа (172, 173)		(9) Меланома кожи (172)	(10) Лимфатическая и кроветворная ткань (200—208)	
	1980—1982	1983—1985	1980—1982	1983—1985	1980—1982	1983—1985	1980—1982	1983—1985	1980—1982	1983—1985	1980—1982	1983—1985	1980—1982	1983—1985	1983—1985	1980—1982	1983—1985
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
(12) РСФСР	158	164	371	151	354	384	226	235	128	131	947	699	115	114	83	151	155
(13) УССР	150	155	382	506	562	688	236	253	134	144	695	722	121	125	88	153	154
(14) БССР	150	155	404	449	614	760	226	228	124	136	885	997	110	114	84	147	160
(15) Узбекская ССР	133	129	187	189	160	176	209	221	147	122	378	400	131	122	110	162	121
(16) Казахская ССР	154	156	252	326	162	171	236	238	107	122	739	735	108	111	79	172	163
(17) Грузинская ССР	123	127	288	297	249	356	201	208	129	143	662	773	123	133	96	158	162
(18) Азербайджанская ССР	166	158	198	276	190	205	269	254	135	123	676	718	146	147	132	273	183
(19) Литовская ССР	140	145	313	486	544	604	226	228	175	157	812	736	91	104	65	134	145
(20) Молдавская ССР	127	129	409	524	324	580	239	221	131	147	533	572	105	141	92	137	155
(21) Латвийская ССР	136	144	387	158	561	572	202	222	139	144	911	902	121	115	76	146	140
(22) Киргизская ССР	109	145	216	424	136	246	197	270	115	120	454	716	99	110	90	133	147
(23) Таджикская ССР	127	124	165	205	207	190	255	218	130	97	419	378	103	103	83	141	170
(24) Армянская ССР	130	138	236	342	254	170	247	228	102	131	628	637	141	135	97	134	155
(25) Туркменская ССР	132	135	300	354	148	143	203	216	81	128	442	573	116	118	150	147	165
(26) Эстонская ССР	146	145	331	545	433	564	206	202	128	134	921	895	118	112	68	165	146
(27) СССР в целом	153	157	333	434	274	304	223	232	128	133	772	813	119	117	85	134	156

(28) * Показатель заболеваемости женщин принят за 100.

Key: 1. Table 7. Correlation of standardized indices of morbidity due to malignant neoplasms among men and women in 1980-1985*—2. All malignant neoplasms (140-208)—3. Oral cavity and throat (141-149)—4. Esophagus (150)—5. Stomach (151)—6. Rectum, rectosigmoid flexure, anus (154)—7. Trachea, bronchi, lungs (162)—8. Skin (172, 173)—9. Melanoma of the skin (172)—10. Lymphatic and hemopoietic tissue (200-208)—11. Republic—12. RSFSR—13. UkSSR—14. BSSR—15. UzSSR—16. KaSSR—17. GSSR—18. AzSSR—19. LiSSR—20. MSSR—21. LaSSR—22. KiSSR—23. TaSSR—24. ArSSR—25. TuSSR—26. ESSR—27. USSR as a whole—28. *Index of morbidity among women taken as 100

neoplasms of the oral cavity and throat was noted in Latvia (from 387 to 158) and in the RSFSR (371 to 151); a reduction was noted in terms of the difference in neoplasms of the esophagus in Armenia (254 to 170); in terms of neoplasms of the rectum in Tadzhikistan (130 to 97); in terms of neoplasms of the lungs in the RSFSR (947 to 699); and in neoplasms of the lymphatic and hemopoietic tissue in Azerbaijan (273 to 183), in Uzbekistan (162 to 121) and Estonia (165 to 146).

Lip cancer accounts for 2.2% in the structure of the morbidity due to malignant neoplasms. Morbidity among rural residents (overall frequency indices) in all republics, except the Central Asian republics and the Kazakh SSR, were higher than those for urban residents (on average, 1.9-fold higher throughout the USSR). Features of the incidence of lip cancer are a function of various combinations of factors such as intensity of solar radiation, smoking habits, degree of skin pigmentation, and number of workers who work outside. In 1985, the highest morbidity rate for lip cancer among both sexes was recorded in the Ukraine; the lowest for men was recorded in the Armenian SSR, and the lowest for women was in the Azerbaijan and Estonian republics (Table 8). The lowest levels of overall frequency indices of morbidity due to lip cancer is noted in oblasts of Uzbek SSR (0.4-2.5 per 100,000); the highest are in the Orenburg (11.0), Belogorod (10.5), and Kirovograd (10.3) oblasts. Over the period 1970 through 1985, the standardized indices for morbidity dropped from 12.1 to 8.4 (by 30.6%) among men and from 1.7 to 1.3 (by 23.5%) among women. A rise in morbidity due to lip cancer for that period was recorded in the BSSR, Tadzhikistan, and Turkmenia only. The most intensive reduction in morbidity for that 15-year period took place among individuals of both sexes in the age groups 30-39 (a 3- to 3.9-fold reduction) and 40-49 (a 1.6- to 2.1-fold reduction). In 1985, morbidity increased somewhat throughout the USSR in general and in a number of republics, primarily because of a growth in the indices in the 40-69 age group. According to 1985 data, men become ill more often than do women by a factor of 6.5. The difference is much smaller in the Central Asian republics (a factor of 3.3-4.8). Among women who are ill, there is a considerably higher percentage of middle-aged and elderly individuals than there is among men (the medians of age distribution are, respectively, 70.4 and 59.4).

In the structure of morbidity among the USSR population, malignant neoplasms of the oral cavity and throat occupy one of the last places (at 2%). Across the country as a whole, the level of overall frequency indices of morbidity is higher among urban residents. The average annual rate of growth of standardized indices of morbidity among men for 1981-1985 was 10.3%. It is most pronounced in Estonia (16.8%), the Ukraine (11.9%), Moldavia (11.4%), and Uzbekistan (11.0%) for men and in BSSR (8.8%), Kazakhstan (5.2%), and Turkmenia (3.7%) for women. A substantial drop in morbidity among women occurred in Kirghizia (-17.6%) and in Armenia (-13.6%). The highest standardized indices for morbidity among men were recorded in 1985 in Estonia (10.1), Moldavia (8.3), and the Ukraine (8.2); for women, they were recorded in Uzbekistan (2.8) and Turkmenia (2.2) (Table 9).

Esophageal cancer is among the forms of cancer with the most pronounced differences in terms of levels of morbidity. The unadjusted frequency indices of morbidity among the rural population is 1.5 times higher than among urban residents. The general, widespread opinion that a deficiency of fresh fruit and vegetables, the consumption of canned fruits and vegetables, the predominance of meat in the diet, and alcohol and tobacco consumption play a role in the appearance of esophageal cancer are weakly linked to the dynamics and features of incidence of this type of cancer. Differences in variations of the interrelationship among these and other factors in specific conditions apparently play a role of some sort. The highest levels of overall frequency indices of morbidity were recorded in the Guryev (42.9 per 100,000 population) and Kzyl-Orda (45.7) oblasts and in the Kara-Kalpak ASSR (34.7). The standardized indices for morbidity due to esophageal cancer were falling until 1981; beginning in 1982, they increased for men with an average annual growth of 1.4%. Among women, the indices stabilized beginning in 1984 (see Table 9). Over the five-year period, the level of morbidity dropped considerably among men in Armenia (average annual rate of growth, -9.3%) and Uzbekistan (-7.0%) and among women in Georgia (-16.3%) Uzbekistan (-14.3%), and Kirghizia (-14.1%). Morbidity jumped sharply in Estonia among men (20.9%) and women (11.9%) and in Moldavia (8.3% and 11.0%, respectively) (Figure 2). In 1985, the highest morbidity in terms of standardized indices was noted in the Union republics of Turkmenia (51.3 per 100,000 among men and 37.6 among women), Uzbekistan (23.5 and 12.8), Kazakhstan (25.6 and 14.4) and Tadzhikistan (16.1 and 8.8).

The number of first-time diagnoses of stomach cancer continues to drop. In 1985, stomach cancer moved into second place in the structure of morbidity due to malignant neoplasms (15.4%), behind lung cancer, and into third place in the structure of morbidity among women (before 1983, it was in first place; in 1983 and 1984, it was in second place). Medical and state-backed measures, along with the positive trends that are taking place in terms of diet among the population, play a substantial role in such changes. The unadjusted frequency and standardized indices for morbidity due to stomach cancer have dropped over a five-year period by 5.5% and 14.0%, respectively. The standardized index for morbidity among men (1981-1985) dropped to 43.4 from 46.0 (average annual rate of growth, -1.4%); among women, to 18.6 from 20.6 (-2.5%).

The most pronounced average annual rate of reduction in morbidity for that period was in Turkmenia (-9.2%) and Armenia (-4.8%) among men and in Kirghizia (-9.4%), Turkmenia (-5.2%), and Kazakhstan (-4.6%) among women (see Figure 2). A growth in morbidity due

(1) ТАБЛИЦА 8. *Динамика возрастно-половых показателей заболеваемости злокачественными новообразованиями населения СССР в 1981—1985 гг.*

(7) Локализация опухоли	(8) Годы	(2) Число больных с впервые в жизни установленным диагнозом злокачественного новообразования на 100 000 населения соответствующего пола и возраста																					
		(3) Мужчины							(4) Всего			(5) Женщины							(6) Всего			
		(9) До 30						(10) 70 и старше	(11) Общий показатель	(12) Стандартизованный показатель		(9) До 30						(10) 70 и старше	(11) Общий показатель	(12) Стандартизованный показатель	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18						
(13) Все злокачественные новообразования (140—208)	1981	11,9	83,0	206,5	600,3	1197,2	1433,9	211,8	227,0	13,3	79,3	204,2	404,0	655,8	782,2	294,6	149,1						
	1982	12,3	80,5	205,2	611,9	1211,6	1452,8	215,5	229,8	13,1	77,0	206,5	405,5	651,0	723,5	296,8	149,6						
	1983	12,0	82,2	215,2	630,0	1220,6	1508,9	221,6	235,7	13,3	79,8	215,5	408,7	651,1	737,8	310,2	152,1						
	1984	12,3	82,8	226,6	644,4	1207,6	1527,2	225,0	238,5	13,5	80,9	220,5	406,6	645,4	741,4	310,5	152,6						
	1985	12,5	83,6	240,2	664,5	1252,6	1568,6	233,1	246,7	13,8	83,2	227,4	409,3	649,4	743,4	312,5	154,5						
В том числе:																							
(14) губы (140)	1981	0,1	2,6	12,0	24,6	42,0	52,4	8,5	8,9	0,0	1,2	3,5	3,6	6,4	3,3	2,0	1,6						
	1982	0,1	2,1	11,0	24,0	41,2	54,1	8,3	8,7	0,0	1,1	2,0	3,5	5,9	6,9	2,0	1,5						
	1983	0,1	2,0	10,6	24,0	38,8	56,9	8,2	8,5	0,0	1,0	2,0	3,7	5,7	6,9	2,0	1,5						
	1984	0,1	2,1	9,8	23,6	37,3	52,8	7,8	8,2	0,0	1,0	2,1	3,7	6,0	6,8	2,0	1,5						
	1985	0,1	1,9	10,1	24,2	39,4	52,4	8,0	8,4	0,0	1,1	2,0	4,0	6,0	7,7	2,2	1,6						
(15) полости рта и глотки (141—149)	1981	0,3	1,6	6,8	17,0	23,1	20,4	4,9	5,0	0,2	1,2	3,5	3,6	6,4	3,3	2,0	1,6						
	1982	0,3	1,7	7,5	18,7	25,8	20,5	5,3	5,4	0,2	1,1	2,0	3,5	5,9	6,9	2,0	1,5						
	1983	0,3	1,7	9,4	20,2	28,1	22,7	5,9	6,0	0,2	1,0	2,0	3,7	5,7	6,9	2,0	1,5						
	1984	0,3	1,9	10,2	21,6	30,1	24,0	6,3	6,5	0,2	1,0	2,1	3,7	6,0	6,8	2,0	1,5						
	1985	0,3	2,4	12,3	24,6	36,5	24,5	7,2	7,4	0,3	1,1	2,0	4,0	6,0	7,7	2,2	1,6						
(16) пищевода (150)	1981	0,0	0,7	5,9	21,9	45,3	69,8	7,8	8,5	0,0	0,6	2,1	7,2	17,2	26,6	4,9	3,2						
	1982	0,0	0,5	5,7	22,7	46,7	67,9	7,9	8,6	0,0	0,4	2,0	6,7	16,1	26,5	4,7	3,0						
	1983	0,0	0,5	6,1	22,9	45,7	69,6	8,0	8,6	0,0	0,4	2,1	6,8	15,6	27,4	4,8	3,1						
	1984	0,0	0,6	6,7	24,1	46,0	65,6	8,1	8,7	0,0	0,3	2,0	6,4	14,5	24,8	4,5	2,8						
	1985	0,0	0,6	7,7	25,4	48,1	66,8	8,5	9,1	0,0	0,4	2,0	6,8	14,2	24,3	4,5	2,8						

Key: 1. Table 8. Dynamics of age-sex indices of morbidity due to malignant neoplasms among USSR population in 1981-1985—2. Number of patients with first-time diagnosis of malignant neoplasm per 100,000 population in terms of age and sex—3. Men—4. Total—5. Women—6. Total—7. Tumor site—8. Year—9. Under 30—10. 70 or older—11. Unadjusted index—12. Standardized index—13. All malignant neoplasms (140-208)—14. Lip (140)—15. Oral cavity and throat (141-149)—16. Esophagus (150)

(1) Продолжение табл. 8

(7) Локализация опухоли	(8) Годы	(2) Число больных с впервые в жизни установленным диагнозом злокачественного новообразования на 100 000 населения соответствующего пола и возраста															
		(3) Мужчины								(5) Женщины							
								(4) Всего								(6) Всего	
		(9) До 30	30—39	40—49	50—59	60—69	(10) 70 и старше	(11) обычный показатель	(12) стандартизованный показатель	(9) До 30	30—39	40—49	50—59	60—69	(10) 70 и старше	(11) обычный показатель	(12) стандартизованный показатель
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
(13) желудка (151)	1981	0.5	9,6	43.8	119.6	246,4	311.0	42.8	46.0	0.5	6.2	19.4	47.2	108.6	145.7	30.4	20.6
	1982	0.5	8,8	44.1	119.6	240.7	305.8	42.5	45.4	0.5	6.1	18.9	48.0	103.5	147.9	30.4	20.4
	1983	0.5	9,2	44.3	121.6	235.5	311.6	42.8	45.5	0.5	6.1	18.7	46.3	97.8	146.0	29.7	19.8
	1984	0.5	8,5	45.0	118.6	224.8	304.9	41.7	44.3	0.5	6.2	18.5	45.8	92.6	141.2	28.9	19.2
	1985	0.5	8,6	44,4	118,2	218,0	296,5	41.0	43,4	0.4	6.1	18,7	45.1	89.0	136.0	28.1	18,6
(14) прямой кишки, ректосигмоидного соединения, ануса (154)	1981	0.2	1,8	6,2	17.9	44,8	60.8	7.4	8.1	0.3	2,4	7,0	17,6	32.5	36,5	9.2	6,5
	1982	0.3	1,8	6.0	18.7	47.6	66.2	7.8	8.6	0.2	2.4	7.2	17.6	33.1	38.5	9.5	6.6
	1983	0.2	1.9	6.5	19.3	48.2	68.4	8.0	8.8	0.2	2.5	7.5	18.4	33.4	39.8	9.8	6.8
	1984	0.2	1.8	7.2	21.1	46.9	71.0	8.4	9.0	0.2	2.2	7.6	18.7	33.7	39.6	9.8	6.8
	1985	0.2	1.8	7.4	22.0	51.2	76.5	8.9	9.6	0.2	2.4	8.0	18.8	34.7	41.8	10.2	7.0
(15) гортани (161)	1981	0.0	1.9	11.6	30.0	39.9	27.2	7.8	8.0	0.0	0.4	0.4	1.1	1.7	1.6	0.5	0.4
	1982	0.1	1.7	11.6	31.4	45.5	26.6	8.1	8.5	0.0	0.4	0.4	1.0	1.7	1.5	0.5	0.4
	1983	0.0	1.6	11.7	32.8	41.3	29.0	8.3	8.4	0.0	0.3	0.5	1.2	1.6	1.2	0.5	0.4
	1984	0.0	1.8	12.5	32.0	42.2	30.8	8.4	8.6	0.0	0.3	0.4	1.2	1.9	1.3	0.5	0.4
	1985	0.0	2.0	13.8	34.1	45.0	30.3	8.9	9.1	0.0	0.2	0.6	1.0	1.8	1.5	0.5	0.4
(16) трахеи, бронхов, легких (162)	1981	0.3	6.1	46.4	178.8	334.0	305.7	52.6	56.3	0.2	2.0	6.1	19.0	41.2	47.3	10.8	7.4
	1982	0.3	5.3	45.5	185.0	342.3	320.4	54.3	57.8	0.2	1.7	6.5	19.1	40.5	50.0	11.0	7.5
	1983	0.3	5.8	48.6	190.6	345.9	332.8	56.0	59.5	0.2	1.6	6.7	19.7	41.2	51.2	11.4	7.6
	1984	0.3	5.7	54.0	202.0	350.6	339.3	58.4	61.7	0.1	1.5	6.6	19.7	41.0	51.7	11.4	7.6
	1985	0.3	5.9	57.6	208.0	367.9	353.8	61.0	64.4	0.1	1.6	6.9	19.4	40.5	53.0	11.5	7.6

Key: 1. Table 8, continued—2. Number of patients with first-time diagnosis of malignant neoplasm per 100,000 population in terms of age and sex—3. Men—4. Total—5. Women—6. Total—7. Tumor site—8. Year—9. Under 30—10. 70 or older—11. Unadjusted index—12. Standardized index—13. Stomach (151)—14. Rectum, rectosigmoid flexure, anus (154)—15. Pharynx—16. Trachea, bronchi, lungs (162)

(1) Продолжение табл. 8

(2) Число больных с впервые в жизни установленным диагнозом злокачественного новообразования на 100 000 населения соответствующего пола и возраста

(7) Локализация опухоли	(8) Годы	(3) Мужчины							(4) Всего		(5) Женщины							(6) Всего	
		(9) До 30	30—39	40—49	50—59	60—69	(10) 70 и старше		(11) общий показатель	(12) стандартизованный показатель	(9) До 30	30—39	40—49	50—59	60—69	(10) 70 и старше		(11) общий показатель	(12) стандартизованный показатель
1		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		17	18
(13) кожи (172, 173)	1981	0,7	6,2	18,4	49,8	109,8	163,5		20,0	21,6	0,9	7,6	21,6	46,5	88,6	121,0		27,3	18,9
	1982	0,7	6,5	18,8	48,2	106,8	166,2		20,0	21,5	1,0	8,1	22,1	45,6	87,8	123,7		26,8	18,4
	1983	0,7	6,5	20,3	51,5	110,8	174,0		21,1	21,6	1,0	8,1	24,0	47,6	86,5	130,3		28,7	19,7
	1984	0,7	6,5	21,2	50,2	107,2	178,4		21,0	22,5	0,9	8,6	23,6	45,9	84,6	131,6		28,5	19,4
	1985	0,6	6,6	22,4	51,0	111,5	186,1		21,8	23,3	1,0	8,6	23,3	47,0	85,7	128,7		28,5	19,5
(14) в том числе меланома (172)	1982	0,3	1,4	2,1	3,3	5,8	6,3		1,5	1,5	0,4	2,3	3,3	3,8	4,3	4,7		2,1	1,7
	1983	0,3	1,4	2,3	3,6	5,8	6,0		1,5	1,6	0,4	2,5	3,8	4,2	5,0	5,0		2,3	1,9
	1984	0,3	1,8	2,8	3,8	6,8	7,2		1,7	1,8	0,4	2,7	4,0	4,3	5,0	5,2		2,4	2,0
	1985	0,2	1,6	2,8	3,4	6,1	6,3		1,6	1,6	0,4	2,7	4,0	4,4	5,5	5,2		2,4	2,0
(15) молочной железы (174, 175)	1981	—	0,1	0,2	0,7	1,3	2,0		0,2	0,2	0,8	20,4	56,9	70,6	70,8	50,6		29,0	22,9
	1982	0,0	0,1	0,2	0,7	1,7	2,3		0,3	0,3	0,8	19,1	59,5	71,6	74,2	53,1		29,7	23,4
	1983	0,0	0,1	0,2	0,6	1,3	2,1		0,2	0,2	0,9	20,3	61,6	73,4	78,4	55,8		30,8	24,4
	1984	0,0	0,1	0,3	0,8	1,6	2,2		0,3	0,3	1,0	21,8	66,9	75,4	83,2	59,8		32,3	25,9
	1985	0,0	0,1	0,3	0,8	1,4	2,2		0,3	0,3	0,8	22,3	68,8	77,3	86,6	62,0		33,0	26,6
(16) шейки матки (180)	1981										0,7	10,8	26,4	51,0	70,8	39,9		20,5	15,6
	1982										0,6	10,0	23,6	47,8	69,4	40,0		19,4	14,8
	1983										0,6	10,8	24,0	44,4	64,7	40,5		18,8	14,4
	1984										0,7	10,5	23,4	41,5	61,3	39,0		17,9	13,8
	1985										0,7	11,2	24,7	39,2	59,6	39,9		17,8	13,8
(17) лимфатической и кроветворной ткани (200—208)	1981	4,8	6,1	10,4	21,0	38,9	40,6		10,3	10,7	3,8	5,9	7,5	13,6	20,8	17,7		8,3	7,0
	1982	4,9	6,3	10,1	21,1	40,3	40,9		10,5	11,0	3,7	5,4	7,4	13,8	21,0	18,4		8,3	7,0
	1983	4,8	6,0	10,3	22,5	40,0	41,3		10,9	10,9	3,7	5,8	8,0	13,4	20,5	19,2		8,4	7,1
	1984	4,9	6,5	11,4	21,5	39,7	42,6		10,8	11,2	3,8	5,7	7,7	13,8	21,5	18,8		8,5	7,2
	1985	5,1	6,6	11,8	23,3	42,5	47,5		11,5	11,9	4,1	5,6	8,2	14,7	21,5	19,7		8,9	7,5

Key: 1. Table 8, continued—2. Number of patients with first-time diagnosis of malignant neoplasm per 100,000 population in terms of age and sex—3. Men—4. Total—5. Women—6. Total—7. Tumor site—8. Year—9. Under 30—10. 70 or older—11. Unadjusted index—12. Standardized index—13. Skin (172, 173)—14. Melanoma of the skin (172)—15. Breast (174, 175)—16. Cervix (180)—17. Lymphatic and hemopoietic tissue (200-208)

(1) ТАБЛИЦА 9. *Возрастно-половые показатели заболеваемости населения СССР в 1985 г. отдельными формами злокачественных новообразований*

(10) Республики	(2) Мужчины								(4) Женщины							
	(6) До 30	30—39	40—49	50—59	60—69	(7) 70 и старше	(3) Всего: (8) обычный показатель	(3) Всего: (9) стандартизованный показатель	(6) До 30	30—39	40—49	50—59	60—69	(7) 70 и старше	(5) Всего: (8) обычный показатель	(5) Всего: (9) стандартизованный показатель
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
(11) Все злокачественные новообразования (140—208)																
(12) СССР в целом	12,5	53,6	240,2	664,5	1252,6	1568,6	233,1	246,7	13,8	83,2	227,4	409,3	649,4	743,4	212,5	154,5
(13) РСФСР	12,9	54,0	253,9	711,0	1347,7	1708,6	260,3	264,6	15,1	86,0	235,6	409,8	663,5	784,0	236,2	159,2
(14) УССР	15,1	61,3	263,7	710,0	1302,6	1626,9	297,9	261,6	17,2	91,0	239,5	456,7	682,1	737,2	256,6	164,8
(15) БССР	13,1	48,2	219,6	592,8	1164,9	1335,8	231,1	222,2	16,1	77,6	204,3	366,2	604,6	625,8	200,6	140,6
(16) Узбекская ССР	9,7	45,7	140,2	355,7	684,4	871,1	80,6	139,6	7,6	57,9	170,3	291,1	486,2	462,7	80,3	108,2
(17) Казахская ССР	9,9	48,9	234,3	696,5	1247,6	1522,8	171,9	244,6	11,0	76,7	209,6	438,6	685,6	746,9	162,0	155,0
(18) Грузинская ССР	12,6	39,1	124,1	329,4	668,9	701,6	132,4	127,9	9,7	61,9	158,2	298,1	393,0	370,6	130,7	99,4
(19) Азербайджанская ССР	7,9	61,7	148,1	430,3	857,0	1089,2	109,1	168,3	7,3	63,5	158,2	273,5	442,0	475,0	92,0	103,5
(20) Литовская ССР	17,8	56,2	222,2	646,6	1251,0	1918,6	295,7	261,0	17,0	94,4	257,0	459,1	683,2	901,0	254,7	174,5
(21) Молдавская ССР	12,3	50,7	220,6	572,1	893,4	1061,9	182,2	191,8	14,5	103,1	243,3	403,1	575,9	594,2	172,9	148,0
(22) Латвийская ССР	14,5	38,7	196,6	619,1	1184,0	1690,6	276,8	237,4	16,6	86,5	222,9	424,7	735,8	874,4	272,0	168,2
(23) Киргизская ССР	6,9	46,0	172,3	480,6	880,7	1028,8	109,7	172,0	8,5	59,3	175,8	352,4	562,2	587,9	112,0	125,1
(24) Таджикская ССР	10,7	33,1	145,3	379,4	700,7	791,1	82,3	138,8	8,4	56,9	152,8	308,8	448,0	512,4	78,0	107,8
(25) Армянская ССР	15,9	53,7	287,7	476,4	937,7	1041,2	152,8	195,6	13,8	74,3	240,0	369,6	477,5	542,4	129,3	132,0
(26) Туркменская ССР	10,8	40,0	137,8	458,1	976,7	1166,1	96,9	179,0	8,4	51,4	168,8	388,0	629,0	732,4	99,4	136,6
(27) Эстонская ССР	14,4	45,2	222,2	721,7	1392,6	2036,3	313,9	278,1	15,5	93,9	281,8	443,5	788,4	1006,4	296,5	186,2
(28) Губа (140)																
(12) СССР в целом	0,1	1,9	10,1	24,2	39,4	52,4	8,0	8,4	0,0	0,2	0,8	3,0	6,1	12,0	2,1	1,3
(13) РСФСР	0,1	2,1	11,0	26,8	44,2	56,2	9,2	9,2	0,0	0,2	1,0	3,2	6,5	12,0	2,3	1,3
(14) УССР	0,1	2,5	12,2	28,4	43,9	61,3	11,2	9,7	0,0	0,2	0,9	3,7	7,2	15,5	3,0	1,6
(15) БССР	—	0,9	7,4	15,7	33,6	42,4	6,5	6,3	0,0	—	0,3	1,7	4,8	7,8	1,4	0,8
(16) Узбекская ССР	0,1	0,5	3,2	9,8	13,3	18,1	1,7	3,0	—	0,3	1,4	2,4	3,2	4,8	0,6	0,8
(17) Казахская ССР	0,1	2,5	12,4	27,6	38,2	59,0	6,6	9,2	0,0	0,4	0,9	3,2	6,3	12,1	1,5	1,4

Key: 1. Table 9. Age-sex indices of morbidity due to individual forms of malignant neoplasms among the USSR population in 1985—2. Men—3. Total—4. Women—5. Total—6. Under 30—7. 70 or older—8. Unadjusted index—9. Standardized index—10. Republic—11. All malignant neoplasms (140-208)—12. USSR as a whole—13. RSFSR—14. UkSSR—15. BSSR—16. UzSSR—17. KaSSR—18. GSSR—19. AzSSR—20. LiSSR—21. MSSR—22. LaSSR—23. KiSSR—24. TaSSR—25. ArSSR—26. TuSSR—27. ESSR—28. Lip (140)

(1) Продолжение табл. 9

(10) Республики	(2) Мужчины						(3) Всего		(4) Женщины						(5) Всего	
	(6) До 30	30—39	40—49	50—59	60—69	(7) 70 и старше	(8) Оценка по исходным	(9) Стандартизованная по возрасту	(6) До 30	30—39	40—49	50—59	60—69	(7) 70 и старше	(8) Оценка по исходным	(9) Стандартизованная по возрасту
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Грузинская ССР	—	0,6	2,8	9,7	14,0	24,4	3,4	3,2		0,3		1,5	2,6	4,0	0,6	0,5
Азербайджанская ССР	0,1	1,1	1,4	9,1	17,0	24,4	2,1	3,3	0,0	0,3	0,3	0,7	1,3	4,8	0,4	0,4
Литовская ССР	0,2	—	6,1	13,3	19,8	50,9	6,3	5,4	0,1	—	0,4	0,4	1,2	8,8	1,1	0,6
Молдавская ССР	0,1	2,9	10,0	26,9	44,0	50,2	8,4	8,9	—	0,7	0,4	2,6	4,8	15,2	1,7	1,3
Латвийская ССР	0,2	—	3,0	7,0	17,2	35,7	4,3	3,7	—	0,6		0,5	2,2	9,6	1,4	0,7
Киргизская ССР	0,1	0,9	7,9	12,3	23,9	26,5	3,0	4,8	—	—	—	3,0	4,8	8,8	1,0	1,0
Таджикская ССР	0,1	1,8	4,9	10,5	17,4	29,0	2,4	4,1	—	—	0,6	2,7	5,3	8,2	0,7	1,0
Армянская ССР	0,1	1,4	3,2	3,8	13,0	11,9	1,7	2,3	—	—	0,6	—	3,6	4,4	0,5	0,5
Туркменская ССР	—	0,6	4,3	12,4	10,0	29,3	1,9	3,6	0,1	—	—	1,9	4,4	8,8	0,7	0,9
Эстонская ССР	0,3	1,8	2,1	8,2	7,1	38,6	4,0	3,4	—	—	—	0,9	3,9	2,2	0,7	0,4
(21) Полость рта и глотка (141—149)																
(22) СССР в целом	0,3	2,4	12,3	24,6	35,5	24,5	7,2	7,4	0,3	1,1	2,0	4,0	6,0	7,7	2,2	1,6
(23) РСФСР	0,3	2,4	12,3	25,8	37,6	28,2	8,0	7,8	0,3	1,1	1,9	3,6	6,2	8,3	2,4	1,6
(24) УССР	0,2	2,6	15,5	28,6	35,8	23,0	9,4	8,2	0,2	1,3	1,8	4,1	4,9	6,7	2,2	1,5
(25) БССР	0,2	3,3	12,7	19,3	34,9	6,7	6,5	6,2	0,3	1,0	1,6	3,2	5,3	5,9	1,9	1,4
(26) Узбекская ССР	0,4	2,9	9,8	13,5	27,5	24,8	3,4	5,8	0,3	1,5	4,1	8,5	11,8	11,4	2,1	2,8
(27) Казахская ССР	0,3	1,4	7,8	24,0	36,9	22,4	4,9	6,7	0,3	1,0	3,0	5,5	7,6	7,8	2,0	2,0
(11) Грузинская ССР	0,3	1,2	3,4	12,7	24,9	14,1	4,2	4,0	0,1	0,8	1,2	5,8	4,4	7,5	2,0	1,4
(12) Азербайджанская ССР	0,3	2,3	6,2	14,2	19,2	12,2	3,0	4,2	0,2	1,3	3,0	2,4	5,1	7,2	1,3	1,5
(13) Литовская ССР	0,2	2,0	9,8	27,7	36,4	25,4	8,2	7,4	0,0	0,4	2,1	3,4	4,3	6,6	1,7	1,1
(14) Молдавская ССР	0,3	1,8	18,1	31,6	31,1	23,7	8,0	8,3	0,2	1,3	1,2	3,0	4,6	6,1	1,5	1,2
(15) Латвийская ССР	0,0	1,7	13,9	16,1	28,6	19,3	6,8	5,9	0,0	0,0	2,1	4,4	5,2	7,6	2,2	1,3
(16) Киргизская ССР	0,1	3,1	7,2	10,3	15,4	22,1	2,7	4,1	0,2	0,4	1,3	3,0	7,7	3,9	1,1	1,2
(17) Таджикская ССР	0,2	1,8	6,1	9,1	15,7	12,7	2,1	3,4	0,3	1,8	1,3	6,1	4,3	4,7	1,2	1,6
(18) Армянская ССР	0,5	0,5	7,8	10,1	18,6	19,8	3,3	4,2	0,3	0,9	1,2	1,2	0,0	3,3	0,7	0,7
(19) Туркменская ССР	0,3	1,7	7,8	22,6	52,6	22,8	4,1	7,6	0,3	1,7	3,5	5,7	7,3	10,5	1,6	2,2
(20) Эстонская ССР	0,0	2,6	20,2	40,0	42,8	24,8	11,6	10,1	0,0	0,0	4,8	2,8	10,4	4,4	2,1	1,7

Key: 1. Table 9, continued—2. Men—3. Total—4. Women—5. Total—6. Under 30—7. 70 or older—8. Unadjusted index—9. Standardized index—10. Republic—11. GSSR—12. AzSSR—13. LiSSR—14. MSSR—15. LaSSR—16. KiSSR—17. TaSSR—18. ArSSR—19. TuSSR—20. ESSR—21. Oral cavity, throat (141-149)—22. USSR as a whole—23. RSFSR—24. UkSSR—25. BSSR—26. UzSSR—27. KaSSR

(1) Продолжение табл. 9

(10) Республики	(2) Мужчины								(4) Женщины							
	(6) До 30	30–39	40–49	50–59	60–69	(7) 70 и старше	(3) Всего: (8) обычный показатель	(9) стандартизованный показатель	(6) До 30	30–39	40–49	50–59	60–69	(7) 70 и старше	(5) Всего: (8) обычный показатель	(9) стандартизованный показатель
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
(11) Пищевод (150)																
(12) СССР в целом	0,0	0,6	7,7	25,4	48,1	66,8	8,5	9,1	0,0	0,4	2,0	6,8	14,2	24,3	4,5	2,8
(13) РСФСР	0,0	0,4	7,2	23,8	46,7	64,2	8,4	8,7	—	0,1	0,9	3,9	9,7	22,9	3,8	2,0
(14) УССР	0,0	0,4	6,5	18,0	28,0	29,6	6,3	5,4	—	0,0	0,5	1,4	3,4	9,3	1,5	0,8
(15) БССР	—	0,3	5,3	11,8	22,2	28,4	4,5	4,3	—	—	0,2	0,4	2,8	5,3	0,8	0,4
(16) Узбекская ССР	0,1	2,2	14,1	58,3	113,8	217,2	12,7	23,5	0,1	2,7	12,7	37,7	74,6	68,2	9,5	12,8
(17) Казахская ССР	0,0	1,4	19,4	63,6	134,6	213,8	17,1	25,6	0,0	1,6	8,5	37,6	78,7	114,3	16,0	14,4
(18) Грузинская ССР	—	0,6	0,7	4,4	14,0	16,9	2,2	2,1	—	—	0,9	1,2	2,6	2,6	0,7	0,5
(19) Азербайджанская ССР	—	1,7	8,7	28,7	79,2	90,8	7,6	12,6	—	2,4	6,3	18,0	30,2	51,2	6,2	6,7
(20) Литовская ССР	—	1,2	5,1	16,0	28,1	19,1	5,3	4,8	0,2	—	0,8	1,3	3,1	5,5	1,2	0,8
(21) Молдавская ССР	0,2	0,4	2,9	17,1	12,8	18,1	3,5	3,6	—	—	1,2	3,4	1,8	8,4	1,2	0,9
(22) Латвийская ССР	—	0,6	3,0	9,8	22,9	25,3	4,4	3,8	—	—	—	2,7	4,5	8,3	1,7	0,9
(23) Киргизская ССР	0,1	—	5,9	34,2	83,6	88,3	7,6	12,8	—	—	1,9	16,3	29,7	43,9	5,2	5,4
(24) Таджикская ССР	0,1	0,4	10,9	40,0	76,7	150,6	9,0	16,1	0,1	1,8	9,1	24,5	44,9	56,5	6,3	8,8
(25) Армянская ССР	—	0,5	1,3	6,3	20,5	21,8	2,1	3,0	0,1	0,4	—	6,0	8,3	14,5	1,9	1,8
(26) Туркменская ССР	—	0,6	23,4	126,6	323,1	400,6	25,3	51,3	—	2,8	29,9	106,1	213,1	255,1	26,9	37,6
(27) Эстонская ССР	—	—	2,1	22,3	23,8	33,1	6,0	5,1	—	—	1,0	—	6,5	10,0	1,8	0,9
(28) Желудок (151)																
(12) СССР в целом	0,5	8,6	44,4	118,2	218,0	296,5	41,0	43,4	0,4	6,1	18,7	45,1	89,0	136,0	28,1	18,6
(13) РСФСР	0,6	9,6	50,6	134,2	246,8	349,8	49,1	49,8	0,5	7,0	21,2	50,6	99,7	150,1	35,0	21,2
(14) УССР	0,4	8,5	42,1	108,4	199,2	257,8	45,2	39,4	0,5	5,0	16,8	41,6	77,9	108,0	27,9	16,1
(15) БССР	0,6	8,8	46,6	122,6	222,5	278,7	45,8	43,7	1,0	5,6	18,7	45,0	99,3	130,7	30,3	19,3
(16) Узбекская ССР	0,2	4,6	24,0	64,6	124,3	171,0	13,4	24,4	0,2	4,1	13,0	25,1	53,0	55,6	7,5	10,1
(17) Казахская ССР	0,4	8,0	45,5	118,1	210,9	307,9	30,2	43,5	0,2	5,0	16,2	45,0	88,2	117,7	18,7	17,2
(18) Грузинская ССР	0,2	2,5	15,5	42,6	80,8	88,2	15,6	14,9	0,2	1,1	7,4	18,6	35,3	49,8	10,4	7,1

Key: 1. Table 9, continued—2. Men—3. Total—4. Women—5. Total—6. Under 30—7. 70 or older—8. Unadjusted index—9. Standardized index—10. Republic—11. Esophagus (150)—12. USSR as a whole—13. RSFSR—14. UkSSR—15. BSSR—16. UzSSR—17. KaSSR—18. GSSR—19. AzSSR—20. LiSSR—21. MSSR—22. LaSSR—23. KiSSR—24. TaSSR—25. ArSSR—26. TuSSR—27. ESSR—28. Stomach (151)

(1) Продолжение табл. 9

(10) Республики	(2) Мужчины								(4) Женщины							
	(6) До 30	30—39	40—49	50—59	60—69	(7) 70 и старше	(3) Всего: (8) обычный показатель	(3) Всего: (9) стандартизованный показатель	(6) До 30	30—39	40—49	50—59	60—69	(7) 70 и старше	(5) Всего: (8) обычный показатель	(5) Всего: (9) стандартизованный показатель
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
(11) Азербайджанская ССР	0,4	5,1	24.8	78.8	174,3	275,0	20,6	33,4	0,3	5.8	12,6	28.0	63,0	83,8	11,2	12,4
(12) Литовская ССР	1,3	9,4	35,6	99,1	221,5	300,1	46,9	41,6	1,0	8,0	23,2	37,1	79,7	145,5	29,8	18,8
(13) Молдавская ССР	0,3	5,8	22,4	64,8	125,5	149,1	22,1	23,5	0,6	4,6	9,3	23,6	46,4	70,2	12,3	10,0
(14) Латвийская ССР	0,2	6,8	33,2	84,6	187,3	224,5	39,2	33,7	—	7,2	14,0	37,3	71,2	117,9	27,8	15,4
(15) Киргизская ССР	0,4	10,6	41,9	112,3	189,4	260,5	24,9	39,6	0,2	6,1	14,0	33,3	83,5	103,4	14,0	15,1
(16) Таджикская ССР	0,2	2,7	30,4	91,2	207,4	136,1	17,0	31,0	0,7	0,4	18,9	35,4	65,2	88,3	9,9	13,7
(17) Армянская ССР	0,1	4,2	36,9	69,5	139,8	174,5	20,8	27,4	0,2	6,1	13,7	25,3	56,0	75,7	11,5	11,5
(18) Туркменская ССР	0,1	4,6	13,0	63,8	132,7	188,9	12,4	24,2	—	3,9	10,6	34,4	70,0	84,1	9,2	12,8
(19) Эстонская ССР	0,3	7,1	27,6	99,9	171,1	303,1	42,1	36,8	0.6	11,5	21,3	40,7	92,8	154,6	35,4	20,4
(20) Прямая кишка, ректосигмоидное соединение, анус (154)																
(21) СССР в целом	0,2	1,8	7,4	22,0	51,2	76,5	8,9	9,6	0,2	2,4	8,0	18,8	34,7	41,8	10,2	7,0
(22) РСФСР	0,2	1,8	7,9	22,8	52,5	82,1	9,7	10,1	0,3	2,7	8,7	19,7	36,4	45,1	11,8	7,5
(23) УССР	0,2	2,0	8,2	28,4	61,8	87,9	13,1	11,4	0,2	2,2	8,2	21,5	38,5	43,2	12,7	7,5
(24) БССР	0,1	1,0	7,2	22,2	53,8	82,3	10,2	9,9	0,1	1,5	5,2	16,8	34,6	45,4	10,4	6,4
(25) Узбекская ССР	0,3	2,6	3,4	9,3	17,4	17,6	2,1	3,6	0,1	1,9	4,5	9,0	15,5	11,1	2,3	3,1
(26) Казахская ССР	0,2	1,7	5,8	17,3	31,7	47,8	4,6	6,6	0,1	2,4	7,7	17,7	28,4	27,5	6,1	5,8
(27) Грузинская ССР	0,3	2,2	3,1	12,1	23,3	30,0	4,8	4,6	0,2	1,7	3,9	10,7	15,7	15,0	4,6	3,3
(11) Азербайджанская ССР	0,3	1,4	4,0	9,1	24,9	35,2	3,0	4,7	0,1	1,6	4,6	8,0	21,9	13,9	3,0	3,5
(12) Литовская ССР	0,4	1,6	10,3	19,2	66,6	120,9	14,4	12,6	0,4	2,0	7,9	21,5	34,9	61,5	13,0	8,1
(13) Молдавская ССР	0,1	1,4	8,6	23,8	58,6	65,5	9,2	9,8	0,4	2,3	7,7	18,9	38,0	40,4	8,8	7,2
(14) Латвийская ССР	—	0,6	6,0	21,0	50,0	81,8	10,9	9,2	0,7	2,8	6,5	9,9	33,7	50,3	11,7	6,6
(15) Киргизская ССР	0,4	0,9	2,6	8,9	25,6	30,9	2,7	4,3	0,2	1,7	5,1	11,5	19,2	13,6	3,3	3,7
(16) Таджикская ССР	0,4	1,4	3,0	7,0	20,9	29,0	2,3	3,9	0,1	3,1	4,6	8,9	11,8	23,6	2,6	3,6
(17) Армянская ССР	0,3	1,4	7,8	10,7	31,7	39,7	4,4	5,9	0,1	2,2	11,3	20,5	15,5	15,6	5,0	5,2
(18) Туркменская ССР	0,3	1,1	3,5	10,3	30,0	26,0	2,4	4,6	0,2	1,7	2,6	9,6	13,1	12,3	2,1	2,8
(19) Эстонская ССР	0,3	—	6,4	23,5	90,3	124,0	15,4	13,9	—	1,8	7,7	18,9	47,1	64,5	15,2	8,5

Key: 1. Table 9, continued—2. Men—3. Total—4. Women—5. Total—6. Under 30—7. 70 or older—8. Unadjusted index—9. Standardized index—10. Republic—11. AzSSR—12. LiSSR—13. MSSR—14. LaSSR—15. KiSSR—16. TaSSR—17. ArSSR—18. TuSSR—19. ESSR—20. Rectum, rectosigmoid flexure, anus (154)—21. USSR as a whole—22. RSFSR—23. UkSSR—24. BSSR—25. UzSSR—26. KaSSR—27. GSSR

(1) Продолжение табл. 9

(10) Республики	(2) Мужчины						(3) Всего		(4) Женщины						(5) Всего	
	(6) До 30	30—39	40—49	50—59	60—69	(7) 70 и старше	(8) обычный показатель	(9) стандартизованный показатель	(6) До 30	30—39	40—49	50—59	60—69	(7) 70 и старше	(8) обычный показатель	(9) стандартизованный показатель
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
(11) Гортань (161)																
(12) СССР в целом	0,0	2,0	13,8	34,1	45,0	30,3	8,9	9,1	0,0	0,2	0,6	1,0	1,8	1,5	0,5	0,4
(13) РСФСР	0,0	2,1	14,5	36,7	47,3	33,5	10,0	9,7	0,0	0,3	0,5	1,0	2,0	1,6	0,6	0,4
(14) УССР	0,1	2,7	16,3	34,5	47,0	31,0	11,2	9,7	0,0	0,2	0,4	0,7	1,0	0,9	0,4	0,3
(15) БССР	0,1	2,4	12,9	33,1	50,1	20,2	9,4	8,9	0,0	0,1	0,2	0,3	0,6	0,8	0,2	0,2
(16) Узбекская ССР	0,0	1,1	4,8	11,5	15,6	15,7	1,9	3,4	0,0	0,8	1,4	1,4	1,8	1,8	0,4	0,6
(17) Казахская ССР	—	1,4	11,5	33,0	34,1	22,9	5,7	7,6	0,0	—	0,7	1,0	2,5	2,8	0,5	0,4
(18) Грузинская ССР	—	1,6	8,6	32,5	60,6	31,0	9,7	9,2	0,1	0,3	—	0,6	3,9	1,8	0,6	0,4
(19) Азербайджанская ССР	0,1	2,0	10,6	32,0	53,2	24,4	5,9	8,8	0,1	—	2,3	1,4	3,9	1,8	0,6	0,8
(20) Литовская ССР	0,1	1,2	17,8	44,2	37,4	39,2	11,7	10,3	—	—	0,4	3,0	0,6	1,6	0,6	0,4
(21) Молдавская ССР	0,2	1,4	11,4	22,3	22,0	15,3	5,5	5,7	—	—	1,6	0,8	2,4	0,8	0,5	0,4
(22) Латвийская ССР	—	2,3	11,4	37,7	50,0	31,2	11,0	9,5	—	0,6	1,6	1,1	2,2	3,8	1,1	0,7
(23) Киргизская ССР	—	1,3	5,9	15,1	34,1	15,4	3,1	5,0	—	0,4	—	3,6	1,0	1,0	0,4	0,5
(24) Таджикская ССР	0,1	1,4	2,4	14,7	17,4	7,2	1,9	3,2	0,1	—	0,6	4,1	2,1	2,4	0,6	0,7
(25) Армянская ССР	—	1,9	17,5	34,8	50,3	35,7	8,0	10,1	0,1	—	1,2	1,8	4,8	1,1	0,6	0,7
(26) Туркменская ССР	—	1,1	8,7	22,6	32,6	26,0	3,4	6,3	—	—	0,9	4,8	5,8	1,8	0,7	1,0
(27) Эстонская ССР	0,3	0,9	12,8	31,7	52,3	35,8	10,6	9,4	—	—	1,0	0,9	1,3	1,1	0,5	0,3
(28) Трахея, бронхи и легкие (162)																
(12) СССР в целом	0,3	5,9	57,6	208,0	367,9	353,8	61,0	64,6	0,2	1,6	6,9	19,4	40,5	53,0	11,5	7,6
(13) РСФСР	0,3	6,3	64,0	234,4	420,9	410,8	72,6	73,3	0,2	1,5	6,6	19,6	41,7	53,6	12,6	7,7
(14) УССР	0,4	6,7	60,8	214,1	372,2	370,5	76,2	66,4	0,3	2,0	8,4	21,7	46,0	65,1	15,9	9,0
(15) БССР	0,2	4,0	51,8	184,2	318,1	255,1	56,8	54,0	0,1	0,7	4,8	13,4	29,4	41,3	9,0	5,5
(16) Узбекская ССР	0,2	2,7	21,0	64,6	126,6	84,8	11,0	20,3	0,1	1,9	4,7	16,6	26,5	26,4	3,8	5,1
(17) Казахская ССР	0,4	7,0	57,3	201,0	348,2	291,6	41,8	60,0	0,2	1,5	8,2	23,2	42,3	42,8	8,3	7,8
(18) Грузинская ССР	0,4	3,1	28,5	83,5	176,4	160,4	30,4	29,3	0,2	0,6	3,3	10,7	18,8	20,7	5,1	3,6

Key: 1. Table 9, continued—2. Men—3. Total—4. Women—5. Total—6. Under 30—7. 70 or older—8. Unadjusted index—9. Standardized index—10. Republic—11. Pharynx (161)—12. USSR as a whole—13. RSFSR—14. UkSSR—15. BSSR—16. UzSSR—17. KaSSR—18. GSSR—19. AzSSR—20. LiSSR—21. MSSR—22. LaSSR—23. KiSSR—24. TaSSR—25. ArSSR—26. TuSSR—27. ESSR—28. Trachia, bronchi, lungs (162)

(1) Продолжение табл 9

(10) Республика	(2) Мужчины									(4) Женщины									
	(6) До 30	30—39	40—49	50—59	60—69	(7) 70 и старше	(3) Всего (8) Необработанный	(3) Всего (9) Стандартизованный	(6) До 30	30—39	40—49	50—59	60—69	(7) 70 и старше	(5) Всего (8) Необработанный	(5) Всего (9) Стандартизованный
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Азербайджанская ССР	0,2	3,7	30,2	105,4	199,2	208,6	22,2	34,9	0,0	0,8	3,6	12,8	26,4	31,9	4,3	4,7
Литовская ССР	0,2	7,0	57,5	191,7	315,1	381,8	69,0	60,9	—	0,4	8,3	16,4	38,0	52,2	11,4	7,1
Молдавская ССР	0,1	6,1	48,2	165,8	209,8	229,9	42,4	44,3	0,3	2,0	9,3	23,6	42,2	46,5	10,1	8,2
Латвийская ССР	0,3	1,7	47,6	216,6	343,2	377,7	73,8	62,9	0,2	0,6	3,8	19,8	35,2	56,7	13,0	7,0
Киргизская ССР	0,2	5,7	43,2	116,4	191,2	169,0	22,3	35,1	0,3	2,6	5,7	16,3	25,9	24,4	4,8	5,3
Таджикская ССР	0,1	1,8	15,2	65,9	101,1	96,2	10,4	18,4	—	1,3	2,6	12,3	22,4	22,4	2,8	3,9
Армянская ССР	0,4	4,7	51,2	147,2	205,1	218,2	33,4	42,2	0,3	4,4	11,3	19,9	19,0	34,5	6,6	6,5
Туркменская ССР	0,1	5,1	19,1	83,4	125,1	117,3	12,5	23,2	0,1	—	5,3	11,5	27,7	26,3	3,2	4,9
Эстонская ССР	—	3,5	44,6	232,7	385,0	385,8	76,2	67,0	—	0,9	9,7	20,8	45,8	51,2	13,9	8,3
(20) Меланома кожи (172)																
СССР в целом	0,2	1,6	2,8	3,4	6,1	6,3	1,6	1,6	0,4	2,7	4,0	4,4	5,5	5,2	2,4	2,0
РСФСР	0,3	1,9	3,3	3,6	6,8	6,8	1,9	1,8	0,5	2,9	4,7	4,6	6,1	5,4	2,9	2,3
УССР	0,4	1,7	3,3	4,5	6,6	7,4	2,2	2,0	0,5	3,6	4,0	5,0	5,6	6,0	3,0	2,3
БССР	0,1	2,1	2,0	2,2	6,6	6,7	1,5	1,5	0,2	2,6	4,6	5,6	3,7	3,7	2,4	1,9
Узбекская ССР	0,0	0,3	1,2	2,0	4,6	0,5	0,4	0,7	0,1	0,8	2,3	1,5	2,4	1,8	0,6	0,8
Казахская ССР	0,1	0,6	1,4	2,3	4,2	4,6	0,6	0,7	0,2	1,2	1,3	2,3	3,6	2,6	1,0	0,9
Грузинская ССР	0,1	0,0	1,0	1,7	3,1	2,8	0,7	0,7	0,2	1,4	0,6	1,2	2,6	4,0	1,0	0,8
Азербайджанская ССР	0,0	0,8	0,7	1,4	1,1	9,5	0,6	0,8	0,0	0,0	1,0	1,0	2,6	1,8	0,4	0,5
Литовская ССР	0,7	2,0	4,2	5,7	5,2	6,3	1,9	1,8	0,6	4,0	3,7	4,6	8,1	9,3	3,5	2,8
Молдавская ССР	0,5	1,1	1,4	1,0	9,2	5,6	1,9	1,9	0,5	4,0	1,6	8,6	4,2	4,6	2,5	2,2
Латвийская ССР	0,2	2,3	3,6	4,2	4,3	5,9	2,0	1,7	0,7	6,1	5,9	6,6	6,7	11,5	4,7	3,4
Киргизская ССР	0,2	0,4	2,6	3,4	1,7	0,0	0,7	0,9	0,1	1,7	1,9	2,4	5,1	6,8	1,0	1,3
Таджикская ССР	0,0	0,0	0,0	2,1	7,0	0,0	0,3	0,6	0,0	2,7	2,0	3,4	3,2	1,2	0,8	1,1
Армянская ССР	0,1	1,9	1,9	3,2	3,7	5,9	1,1	1,3	0,0	1,3	4,2	0,6	7,1	3,3	1,2	1,3
Туркменская ССР	0,0	0,0	0,9	1,0	0,0	3,2	0,2	0,3	0,0	0,6	0,0	0,0	1,4	3,5	0,2	0,3
Эстонская ССР	0,0	0,8	3,2	5,9	7,1	8,3	2,1	1,8	0,0	1,8	7,7	4,7	10,4	8,9	3,6	2,6

Key: 1. Table 9, continued—2. Men—3. Total—4. Women—5. Total—6. Under 30—7. 70 or older—8. Unadjusted index—9. Standardized index—10. Republic—11. AzSSR—12. LiSSR—13. MSSR—14. LaSSR—15. KiSSR—16. TaSSR—17. ArSSR—18. TuSSR—19. ESSR—20. Melanoma of the skin (172)—21. USSR as a whole—22. RSFSR—23. UkSSR—24. BSSR—25. UzSSR—26. KaSSR—27. GSSR

(1) Продолжение табл. 9

(10) Республики	(2) Мужчины								(4) Женщины							
	(6) До 30	30—39	40—49	50—59	60—69	(7) 70 и старше	(3) Всего: (8) обычный показатель	(3) Всего: (9) стандартизованный показатель	(6) До 30	30—39	40—49	50—59	60—69	(7) 70 и старше	(5) Всего: (8) обычный показатель	(5) Всего: (9) стандартизованный показатель
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
(11) Другие новообразования кожи (173)																
(12) СССР в целом	0,4	5,0	19,6	47,6	105,4	179,8	20,2	21,7	0,6	5,9	19,3	42,6	80,2	123,5	26,1	17,4
(13) РСФСР	0,4	4,8	19,2	47,0	106,0	176,2	20,7	21,4	0,6	6,2	20,3	42,2	80,0	122,2	28,3	17,5
(14) УССР	0,6	5,5	22,5	57,7	121,4	220,3	29,5	25,8	0,6	6,0	19,0	48,2	88,5	138,5	33,6	19,1
(15) БССР	0,7	5,5	15,8	35,4	87,4	149,2	18,5	17,9	1,0	5,9	18,9	38,8	68,8	105,8	24,5	15,8
(16) Узбекская ССР	0,5	4,6	16,3	37,0	73,8	119,6	8,8	15,8	0,3	4,4	13,6	31,0	59,4	95,8	9,9	12,9
(17) Казахская ССР	0,2	5,3	20,0	56,4	104,8	182,7	15,5	22,6	0,6	6,9	22,4	52,2	94,5	135,4	21,9	20,2
(18) Грузинская ССР	0,5	5,0	14,1	29,8	72,2	96,6	14,2	13,9	0,4	3,4	10,1	22,6	42,3	60,4	13,1	9,1
(19) Азербайджанская ССР	0,3	9,6	11,6	28,7	55,5	111,1	8,7	13,6	0,2	2,4	7,6	17,6	40,5	58,5	7,3	7,9
(20) Литовская ССР	0,5	6,6	21,5	42,1	94,6	155,9	22,7	20,0	0,8	4,0	23,2	44,3	77,8	129,0	28,4	18,1
(21) Молдавская ССР	0,2	5,0	26,2	58,0	111,8	199,3	22,8	24,5	0,6	8,0	31,5	46,7	91,7	131,2	25,0	20,6
(22) Латвийская ССР	0,0	2,3	13,9	44,7	108,7	166,5	23,2	19,8	0,5	3,3	12,4	39,0	77,2	144,7	31,1	16,6
(23) Киргизская ССР	0,1	6,2	17,0	36,3	85,3	156,7	11,0	18,1	0,2	5,2	17,7	48,4	78,7	128,7	16,4	17,6
(24) Таджикская ССР	0,4	2,7	26,1	44,9	99,4	147,0	11,3	20,1	0,5	5,3	18,9	47,7	103,7	130,7	14,1	19,5
(25) Армянская ССР	0,3	2,3	18,8	27,8	82,0	103,1	10,8	14,7	0,1	2,2	8,3	22,3	45,2	75,7	9,5	9,4
(26) Туркменская ССР	0,3	4,6	14,7	28,8	95,2	136,8	8,5	16,8	0,4	5,6	13,1	42,0	75,9	112,1	11,6	15,8
(27) Эстонская ССР	0,3	3,5	19,1	45,8	87,9	264,5	27,2	23,7	1,5	7,1	20,3	46,3	74,5	139,0	32,4	18,9
(28) Молочная железа (174, 175																
(12) СССР в целом	—	0,1	0,3	0,8	1,4	2,2	0,3	0,3	0,8	22,3	68,6	77,3	86,6	62,0	33,0	26,6
(13) РСФСР	—	0,1	0,2	0,6	1,0	1,9	0,2	0,2	0,9	22,8	72,2	76,6	87,8	65,3	36,3	27,3
(14) УССР	—	0,1	0,4	0,9	1,6	2,7	0,4	0,4	1,0	24,5	73,0	89,3	94,5	63,4	40,9	29,1
(15) БССР	—	—	0,6	1,1	2,0	1,9	0,4	0,4	0,7	22,2	64,1	70,8	78,5	44,2	30,8	24,1

Key: 1. Table 9, continued—2. Men—3. Total—4. Women—5. Total—6. Under 30—7. 70 or older—8. Unadjusted index—9. Standardized index—10. Republic—11. Other neoplasms of the skin (173)—12. USSR as a whole—13. RSFSR—14. UkSSR—15. BSSR—16. UzSSR—17. KaSSR—18. GSSR—19. AzSSR—20. LiSSR—21. MSSR—22. LaSSR—23. KiSSR—24. TaSSR—25. ArSSR—26. TuSSR—27. ESSR—28. Breast (174, 175)

(1) Продолжение табл. 9

	(10) Республики	(2) Мужчины						(3) Всего		(4) Женщины						(5) Всего	
		(6) До 30	30—39	40—49	50—59	60—69	(7) 70 и старше	(8) обычный показатель	(9) стандартизованный показатель	(6) До 30	30—39	40—49	50—59	60—69	(7) 70 и старше	(8) обычный показатель	(9) стандартизованный показатель
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
(11)	Узбекская ССР	0.0	0.1	0.3	0.9	1.8	1.0	0.2	0,3	0.4	12.2	36.2	41.5	60.2	35.4	10.6	15.2
(12)	Казахская ССР	—	...	0.4	0.5	0.4	1.0	0.1	0,2	0.8	18.8	51.4	65.8	62.9	47.6	20.6	20.9
(13)	Грузинская ССР	—	0.3	0.3	0.7	1.6	1.9	0.3	0.3	1.2	27.1	67.3	97.3	94.6	56.9	36.5	29.3
(14)	Азербайджанская ССР	—	—	0.4	0.7	3.4	2.7	0.4	0.4	0.6	22.2	52.4	61.3	64.3	42.2	17.6	20.8
(15)	Литовская ССР	—	—	0.5	0.5	6.2	1.1	0.5	0.5	0.7	24.9	76.4	82.2	108.4	81.8	40.7	30.4
(16)	Молдавская ССР	—	—	0.5	3.1	—	7.0	0.6	0.6	0.6	28.3	82.5	78.5	85.0	64.8	32.6	29.0
(17)	Латвийская ССР	—	—	0.6	—	5.7	3.0	0.6	0.6	0.7	31.6	83.5	82.3	104.9	82.2	45.6	32.0
(18)	Киргизская ССР	—	—	0.6	0.7	—	—	0.1	0.1	0.5	14.3	48.9	58.7	61.4	36.1	15.3	18.6
(19)	Таджикская ССР	—	—	—	1.4	—	1.8	0.1	0.2	0.2	12.0	28.1	44.3	37.4	23.6	8.4	12.4
(20)	Армянская ССР	—	0.5	2.6	5.0	9.3	9.9	1.4	1.8	1.0	21.9	76.2	94.5	88.1	50.1	27.2	28.7
(21)	Туркменская ССР	—	—	—	—	—	—	—	—	0.6	10.1	34.3	46.8	36.5	24.5	9.2	13.3
(22)	Эстонская ССР	—	—	—	—	—	2.8	0.1	0.1	0.3	32.8	94.9	97.4	103.3	104.5	50.4	35.4
	(23) Лимфатическая и кроветворная ткань (200—208)																
(24)	СССР в целом	5.1	6.6	11.8	23.3	42.5	47.5	11.5	11.9	4.1	5.6	8.2	14.7	21.5	19.7	8.9	7.5
(25)	РСФСР	5.4	6.2	11.4	22.1	43.0	46.3	11.6	11.8	4.4	5.4	7.7	14.0	20.7	18.3	9.0	7.4
(26)	УССР	6.2	8.3	14.2	29.2	50.4	56.3	15.6	14.4	5.6	6.8	9.4	17.1	25.6	22.3	11.6	9.2
(27)	БССР	5.7	6.2	12.3	28.9	36.9	54.4	13.2	12.7	4.4	5.9	9.4	14.2	24.1	22.5	9.8	8.0
(11)	Узбекская ССР	3.0	5.4	7.2	13.3	19.3	24.3	5.0	6.6	1.6	3.3	8.1	10.9	13.6	10.8	3.7	4.6
(12)	Казахская ССР	3.6	4.6	7.7	18.5	28.1	31.0	6.8	8.2	2.7	5.2	6.0	10.1	14.3	11.2	5.2	5.1
(13)	Грузинская ССР	6.1	6.2	11.3	12.4	29.5	23.4	9.5	9.5	3.8	4.8	5.1	15.9	13.1	11.9	7.0	6.1
(14)	Азербайджанская ССР	3.4	10.2	15.6	22.2	30.6	31.2	8.2	10.3	2.1	7.8	6.6	11.4	9.6	12.0	4.8	5.1
(15)	Литовская ССР	6.2	8.2	9.8	34.1	63.4	87.0	17.8	16.4	4.5	5.6	10.8	24.9	32.4	53.8	15.1	11.0
(16)	Молдавская ССР	5.2	7.9	16.7	24.4	29.3	44.6	11.5	11.8	4.8	4.6	9.7	19.7	20.5	12.2	8.6	8.0
(17)	Латвийская ССР	6.5	6.2	8.4	32.8	75.8	68.4	17.4	16.0	6.8	5.0	8.1	23.0	30.7	47.2	15.7	11.4

Key: 1. Table 9, continued—2. Men—3. Total—4. Women—5. Total—6. Under 30—7. 70 or older—8. Unadjusted index—9. Standardized index—10. Republic—11. UzSSR—12. KaSSR—13. GSSR—14. AzSSR—15. LiSSR—16. MSSR—17. LaSSR—18. KiSSR—19. TaSSR—20. ArSSR—21. TuSSR—22. ESSR—23. Lymphatic and hemopoietic tissue (200-208)—24. USSR as a whole—25. RSFSR—26. UkSSR—27. BSSR

(1) Продолжение табл. 9

(10) Республики	(2) Мужчины								(4) Женщины							
	(6) До 30	30—39	40—49	50—59	60—69	(7) 70 и старше	(3) Всего: (8) обычный показатель	(3) Всего: (9) стандартизованный показатель	(6) До 30	30—39	40—49	50—59	60—69	(7) 70 и старше	(5) Всего: (8) обычный показатель	(5) Всего: (9) стандартизованный показатель
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
(11) Киргизская ССР	2,3	4,4	2,6	16,4	27,3	15,4	4,6	6,0	2,3	4,3	6,3	9,7	15,3	16,6	4,8	5,1
(12) Таджикская ССР	5,3	7,2	12,8	21,7	26,1	16,3	7,8	9,7	2,8	5,3	7,8	9,5	11,8	16,5	4,7	5,5
(13) Армянская ССР	8,2	13,5	18,1	23,4	29,8	53,5	13,4	14,7	5,6	7,0	12,5	19,3	34,5	31,2	10,6	10,8
(14) Туркменская ССР	4,9	6,8	15,6	15,4	20,0	19,5	7,2	9,0	2,8	4,5	8,8	13,4	23,4	8,8	5,2	6,2
(15) Эстонская ССР	6,6	6,2	18,1	29,4	59,4	102,0	18,7	17,3	5,8	3,5	15,5	24,6	32,7	47,8	16,3	11,8
(16) Шейка матки (180)																
(17) СССР в целом									0,7	11,2	24,7	39,2	59,6	39,9	17,8	13,8
(18) РСФСР									0,8	10,9	24,3	38,8	61,7	42,3	19,4	13,9
(19) УССР									0,9	13,7	25,7	44,2	61,7	38,0	21,4	14,8
(20) БССР									0,7	11,6	19,7	29,2	51,8	32,9	15,5	11,5
(21) Узбекская ССР									0,2	7,5	23,5	31,2	43,9	32,5	7,7	10,8
(22) Казахская ССР									0,8	11,4	28,6	45,3	67,6	44,4	15,5	15,5
(23) Грузинская ССР									0,6	9,3	22,0	36,3	36,6	19,8	13,2	10,6
(24) Азербайджанская ССР									0,3	5,2	16,2	25,6	39,2	13,9	6,8	8,1
(25) Литовская ССР									1,1	11,2	30,3	43,8	49,8	42,3	19,6	14,5
(26) Молдавская ССР									1,5	25,3	36,0	51,4	66,3	36,6	21,2	18,8
(27) Латвийская ССР									0,5	8,3	14,0	26,3	59,9	36,3	16,4	10,7
(11) Киргизская ССР									0,8	6,9	22,8	50,2	64,3	48,8	12,8	14,7
(12) Таджикская ССР									—	6,7	27,4	23,9	26,7	30,6	6,2	9,3
(13) Армянская ССР									0,7	7,9	31,0	27,1	33,3	33,4	10,5	11,1
(14) Туркменская ССР									0,4	8,4	28,1	38,2	55,4	47,3	9,6	13,6
(15) Эстонская ССР									0,3	14,2	22,3	32,2	57,5	48,9	19,8	13,2

Key: 1. Table 9, continued—2. Men—3. Total—4. Women—5. Total—6. Under 30—7. 70 or older—8. Unadjusted index—9. Standardized index—10. Republic—11. KiSSR—12. TaSSR—13. ArSSR—14. TuSSR—15. ESSR—16. Cervix (180)—17. USSR as a whole—18. RSFSR—19. UkSSR—20. BSSR—21. UzSSR—22. KaSSR—23. GSSR—24. AzSSR—25. LiSSR—26. MSSR—27. LaSSR

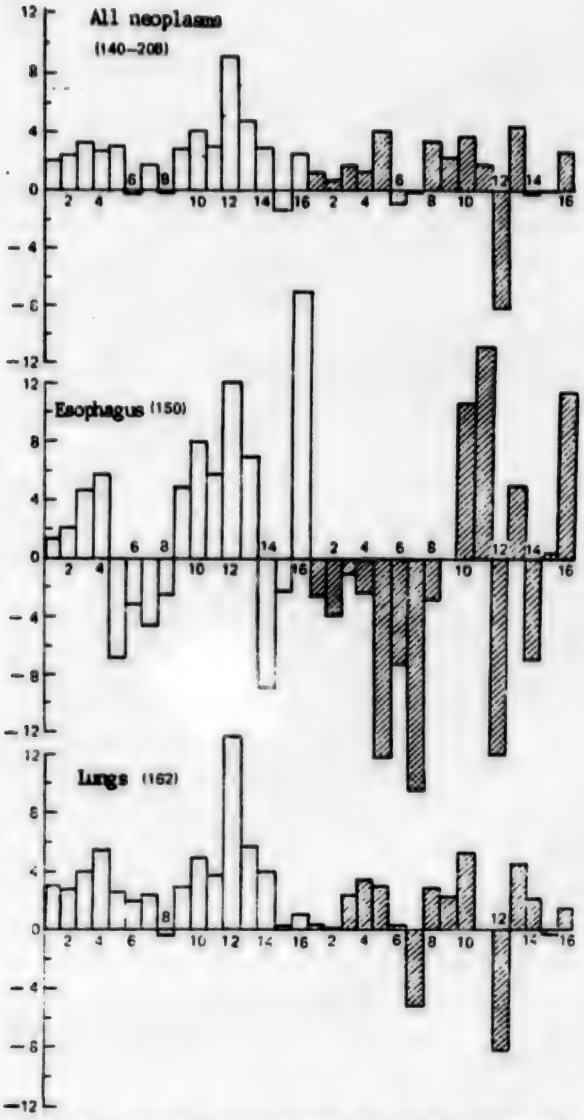


Figure 2. Average annual rate of growth of indices of morbidity due to malignant neoplasms among the USSR population and the Union republics in 1981-1985. Light columns represent men, cross-hatched columns represent women. 1. USSR—2. RSFSR—3. UkSSR—4. BSSR—5. UzSSR—6. KaSSR—7. GSSR—8. AzSSR—9. LiSSR—10. MSSR—11. LaSSR—12. KiSSR—13. TaSSR—14. ArSSR—15. TuSSR—16. ESSR

to stomach cancer (1981-1985) was noted in Tadzhikistan among both sexes (5.0% and 5.9%) and in Kirghizia among men (8.1%). In 1985, the highest morbidity (standardized indices) were recorded in the RSFSR (49.8 per 100,000 population among men and 21.2 among women), in the BSSR (43.7 and 19.3), and in the Kazakh SSR (43.5 and 17.2); the lowest was recorded in the Georgian republic (14.9 and 7.1) and in the Moldavian republic (23.5 and 10.0).

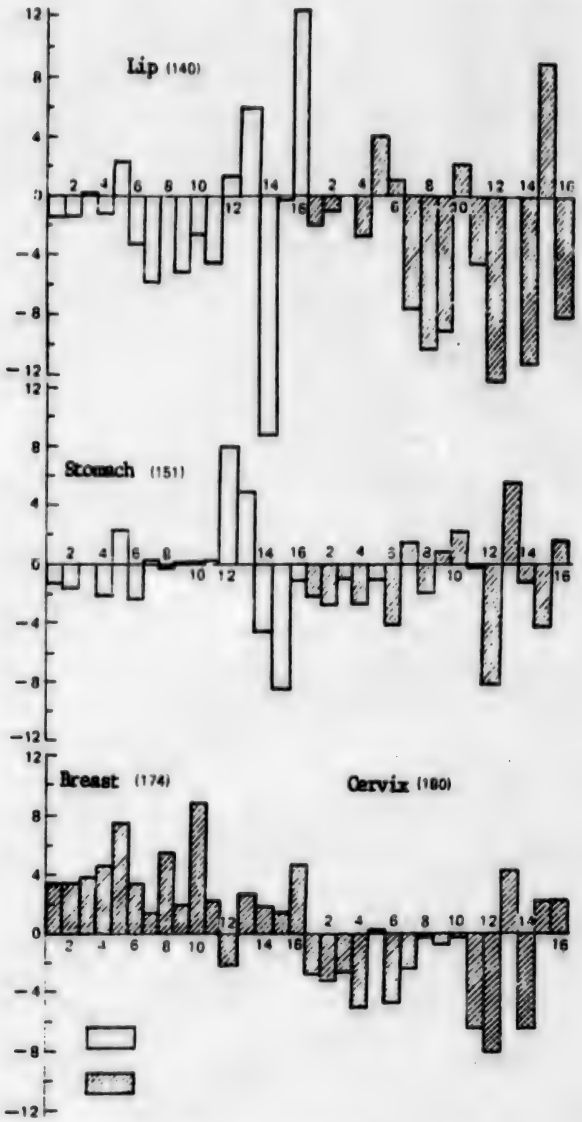


Figure 2, continued.

Rectal cancer accounts for 4.3% in the structure of morbidity due to malignant neoplasms. The overall frequency indices of morbidity for the country as a whole and for the union republics (excluding the BSSR, Lithuania, and Estonia) is higher among urban residents. The highest morbidity (unadjusted index) in 1985 was noted in the Ternopol (25.2 per 100,000 population), Kirovograd (18.5), Magadan (17.7), and Poltava (17.6) oblasts. The highest standardized indices for morbidity among men and among women were recorded in Estonia (13.9 and 8.5) and Lithuania (12.6 and 8.1), republics with a diet rich in animal fats and proteins, but poor in dietary fiber; the lowest were recorded in the Central Asian republics. The average annual rate of growth (1981-1985) of morbidity among men (4.4%) was higher than among women (2.3%). The growth took place

among individuals of both sexes, primarily because of those over 60 year of age. Among men, the growth was most pronounced in Turkmenia (17.4%), Moldavia (11.3%), and Azerbaijan (9.2%); among women, in Tadzhikistan (10.3%), Moldavia (7.0%), and Uzbekistan (5.5%). A drop in morbidity due to rectal cancer was noted only in women, in Kirghizia (-7.1%), Turkmenia (-3.8%), Armenia (-3.7%), and the BSSR (-0.2%).

The percentage of cancer of the pharynx in the structure of morbidity due to malignant neoplasms among the USSR population is comparatively low (2.0%). In six republics (including the largest of the republics—the RSFSR, the Ukraine, and the BSSR), overall frequency indices indicate that urban residents are afflicted less often than are rural residents. The unadjusted frequency indices reach their highest levels in the Tula (8.2 per 100,000), Tambov (7.7), Odessa (7.5), and Pskov (7.5) oblasts. A steady growth in the age-related indices of the morbidity of the male population of the USSR is observed from the age of 40. The growth of the standardized index for the period 1981 through 1985 is 18.8% among men, with an average annual rate of growth of 3.3%; a stabilization of the level of morbidity is noted among women for the country as a whole. The highest rate of growth of morbidity among men was recorded in Kirghizia (17.8%), Latvia (7.9%), and the BSSR (5.1%); among women it was in Lithuania (20.4%), Lativa (13.3%), the BSSR (12.5%), and Moldavia (10.7%). The most pronounced drop in morbidity indices was among women in Uzbekistan (-15.2%), Estonia (-10.6%), Tadzhikistan (-9.4%), Georgia (-6.9%), and Armenia (-6.1%). In 1985, men were most often afflicted with pharyngeal cancer in Lithuania (standardized index of 10.3 per 100,000), Armenia (10.1), and the RSFSR and the Ukraine (9.7 in each); women were most often afflicted in Turkmenia (1.0), Azerbaijan (0.8), and Tadzhikistan and Armenia (0.7 in each).

The number of individuals with first-time diagnosis of lung cancer in 1981-1985 increased by 18.6% and exceeded 96,000. The unadjusted frequency index of morbidity over this period rose by 14.5%, the standardized index by 14.8%. The morbidity of urban residents in overall frequency indices is higher than among rural residents, especially in the republics with a poor accounting: it is 7.4-fold higher in Tadzhikistan, 3.9-fold higher in Turkmenia, and 2.2- to 2.6-fold higher in Uzbekistan, Kirghizia, and Azerbaijan. Rural residents in the Ukraine are afflicted more often than are urban residents by a factor of 1.2; the same is true in the BSSR and Lithuania (by a factor of 1.6). In 1985, high unadjusted frequency indices of morbidity were noted in the Kirovograd (58.7 per 100,000), Tula (57.7), Saratov (56.6), and Pskov (55.7) oblasts and in the Altay Kray (56.0). Over the period of 1981 through 1985, the standardized index of morbidity due to lung cancer increased by 14.4% among the male population of the country and by 2.7% among the female population, with respective average annual growth rates of 3.4% and 0.7%. The highest level of morbidity among males in 1985 was recorded in the RSFSR (73.3 per 100,000), Estonia (67.0), and the UkSSR (66.4); among women, in the UkSSR (9.0) and in the Moldavian and Estonian republics (8.2 each). According to our data,[4] there is a high correlation between the dynamics of morbidity due to lung cancer in individual republics and the per-capita expenditures on tobacco products taken with an interval of 12-15 years (from 0.649 in Georgia to 0.940 in the BSSR).

Neoplasms of the skin accounts for 11.4% of malignant neoplasms in the structure of morbidity among the USSR population. In 1985, in the structure of morbidity among women, skin cancer moved from third place to second. The unadjusted frequency indices of morbidity are higher in urban residents: by a factor of 2.6-4.4 in the Central Asian republics, 2.1 in Kazakhstan, 1.7 in Azerbaijan, and 1.3 in Estonia. Usual morbidity indices are higher among rural residents in the BSSR (1.2-fold) and Armenia ((1.8-fold) only. In 1985, the highest levels of unadjusted morbidity indices were observed in the Krasnodar (59.1 per 100,000) and Stavropol (48.9) krays and in the Kherson (51.2), Nikolayev (49.5), Kirovograd (49.3), Odessa (48.7), Sumy (45.8), and Volgograd (45.5) oblasts. Over the 1981-1985 period, the standardized indices for morbidity due to malignant neoplasms of the skin increased among men by 7.9% and among women by 3.2%, with average annual rates of growth of 1.9% and 0.7%, respectively. The highest levels of morbidity in 1985 among individuals of both sexes were recorded in the Ukraine (men, 27.8; women, 21.4), Moldavia (26.4 and 22.8), and Estonia (25.5 and 21.5).

The standardized indices of morbidity due to melanoma of the skin grew over the period of 1982-1985 among women by 16.2% (to 2.01 from 1.73); in spite of a drop in morbidity in 1985, among men the growth in morbidity over 1982-1985 was still 7.9% (to 1.63 from 1.51). Unlike skin cancer, melanoma is encountered in women more often than in men (in 100 women for every 85 men). Turkmenia, Uzbekistan, and Azerbaijan are exceptions (see Table 7). The median of the age distribution of melanoma patients is considerably lower than among skin cancer (see Table 4). There is a high correlation between morbidity due to malignant neoplasms of the skin and lip cancer, which is completely consistent with the parallels between their geographical prevalence and the intensity of ultraviolet solar radiation, degree of pigmentation of the skin, and certain occupational factors.

Breast cancer occupies fourth place in the structure of morbidity due to malignant neoplasms among the country's population (8.0%) and first place in the structure of the female population (15.6%). The unadjusted frequency indices of morbidity are higher among urban residents, especially in the republics of Central Asia (higher by a factor of 2.6-6.5) and Transcaucasia (higher by a factor of 1.8-3.6). That correlation does not exceed 1.5 in the Baltic republics, the BSSR, and Moldavia. Morbidity is 25.0 per 100,000 population or greater in the Dnepropetrovsk (25.0), Voroshilovgrad (26.0), Tula

(26.2), Ivanovo (26.8), and Odessa (33.6) oblasts. The standardized index of morbidity among women increased over the 1981-1985 period by 16.2%, with an average annual growth rate of 3.8%. Morbidity dropped, by 8.8%, only in Kirghizia (average annual growth rate, -2.3%). The highest morbidity due to breast cancer was in the Baltic republics (17.5-20.4 per 100,000 population), the Ukraine (17.0), Georgia (16.6), and Armenia (16.4); the lowest was in the Central Asian republics (7.2-10.4), which was associated with the varying intensity of the action of factors that are responsible for a hormonal background in the body. We established that there is elevated risk for breast cancer when there is any deviation from certain "physiological norms" typical of a given population, regardless of whether the deviation is above or below.[1]

The percentage of cervical cancer in the structure of morbidity due to malignant neoplasms is dropping and accounted for an average of 4.2% in 1985 for the entire population of the country. The unadjusted frequency indices of morbidity are higher in among urban residents in the republics of Central Asia (by a factor of 1.6-8.3) and Transcaucasia (by 1.4-3.9). The rural population is afflicted considerably more often than is the urban population in Moldavia (rural higher by 1.7-fold), the Ukraine (higher by 1.5-fold), and in Estonia and the BSSR (higher by 1.4-fold). The highest unadjusted frequency indices were recorded in the East Kazakhstan (45.1 per 100,000), Alma-Ata (20.9), and Dzhambul (20.0) oblasts. Within the range of 15.0-16.8 per 100,000 population were indices for the Voroshilovgrad (15.0), Perm (15.2), Sumy (15.1), Kurgan (115.3), Odessa (16.2), Zhitomir (6.1), and Grodno (16.8) oblasts and in the Chuvash ASSR (15.3). Cervical cancer is a demonstrative example of the effect preventive measures have on prevalence of a disease.[2] Over the period 1981-1985, the unadjusted frequency index of morbidity due to cervical cancer dropped by 13.2%, and the standardized index dropped by 11.8

(average annual rate of growth, -3.1%) because of the age group 50-59. In those under 40 and in those over 70, the morbidity indices stabilizes. The highest morbidity due to cervical cancer in 1985 was in Moldavia (unadjusted index of 21.2 per 100,000, standardized index of 18.8), Kazakhstan (15.5 and 15.5), the Ukraine (21.4 and 14.8), and Kirghizia (12.6 and 14.7).

The percentage reflected by malignant neoplasms of lymphatic and hemopoietic tissue is holding steady at 4.4-4.5%. In terms of unadjusted frequency indices, urban and rural residents are afflicted with roughly the same frequency in the Ukraine, the BSSR, Georgia, and Moldavia. Morbidity is highest among the rural population of Lithuania. In the other republics and on average throughout the country, the morbidity among the urban population is higher than among the rural population. The highest levels of unadjusted frequency indices of morbidity in 1985 were noted in the Odessa (17.4 per 10,000), Tula (16.2), Cherkassy (15.5), Kharkov (15.4), Voroshilovgrad (15.2), and Mogilev and Poltava (15.0 each) oblasts. The highest levels of standardized indices in 1985 was noted in Estonia (17.3 among men and 11.8 among women), Lithuania (16.4 and 11.0), Latvia 16.0 and 11.4), and Armenia (14.7 and 10.8). The average annual rate of growth (1981-1985) was especially high in Tadzhikistan (25.5% among men and 19.5% among women), Uzbekistan (9.6% and 12.3%), and Armenia (5.6% and 3.7%), which is more than likely associated with improved record-keeping in this category of patients.

Over the five-year period of 1981-1985, the number of persons who died from malignant neoplasms in the USSR grew by 37,200 (9.8%) and reached 417,600 by the end of the period (Table 10), which amounts to 14.2% of the total number of individuals who died from all causes. Occupying first place in the structure of mortality rate among the USSR population is stomach cancer, second place is held by lung cancer, and third place is held by breast cancer. A similar relationship is maintained among the basic forms of malignant neoplasms when frequency indices of mortality are examined. The mortality levels are dropping for stomach cancer and cervical cancer, with average annual growth rates of -1.16% and -2.3%, respectively. On average, for all malignant neoplasms, the mortality index increased over the five-year period by 6.0%, with an average annual growth rate of 1.5%. Particularly intense was the growth associated with lip cancer and cancer of the oral cavity and throat (5.3%), prostate cancer (4.9%), and colon cancer (4.3%).

The average annual rate of growth of morbidity on the whole and for most forms of tumors is higher than the mortality rate. The opposite picture is observed with malignant neoplasms of the esophagus, pharynx, and skin (Figure 3). The rate of growth (1982-1984) of morbidity due to melanoma of the skin (3.6%) is twice as high as that for skin cancer (1.5%). The morbidity rate associated with stomach cancer and cervical cancer is dropping at faster rates than is the mortality rate.

On the whole, the lag of the growth rates associated with mortality behind those associated with morbidity, plus the increase in the index of accumulation of contingents of patients, indicates definite progress in the struggle against cancer.

References

1. Dvoyrin V. V., Medvedev A. B. "Epidemiologiya raka i predopukholevykh zabolevaniy molochnoy zhelezy v Kabardino-Balkarskoy ASSR" [Epidemiology of Cancer and Pretumorous Diseases of the Breast in Kabardino-Balkar ASSR]. Nalchik, 1977, 153 pp.

2. Dvoyrin V. V., Aksel Ye. M. "Socioeconomic Basis of the Oncological Component of Annual Mass Health Screening of the Entire Population." In "Dispanserizatsiya naseleniya i uchastiye spetsializirovannoy onkologicheskoy seti v yeye realizatsii. Tez. dokl." [Mass Health Screening of the Population and Participation of the Specialized Oncology Network in Implementing It. Abstracts of Reports]. Yaroslavl, 1985, pp 62-63.

(1) ТАБЛИЦА 10. *Смертность населения СССР от злокачественных новообразований в 1981–1985 гг.*

(6) Локализация	(2) Абсолютные числа умерших					(3) Структура причин смерти (%)					(4) Частота на 100 000 населения					(5) Среднегодовой темп прироста
	1981	1982	1983	1984	1985	1981	1982	1983	1984	1985	1981	1982	1983	1984	1985	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
(7) Губа, полость рта, глотка (140—149)	7 081	7 562	8 258	8 703	9 030	1,9	1,9	2,0	2,1	2,2	2,6	2,8	3,0	3,2	3,2	5,3
(8) Пищевод (150)	14 136	14 567	15 090	15 051	15 224	3,7	3,7	3,7	3,6	3,6	5,3	5,4	5,5	5,5	5,5	0,93
(9) Желудок (151)	87 789	88 897	89 357	88 585	86 754	23,1	22,8	22,1	21,5	20,8	32,8	32,9	32,8	32,3	31,3	-1,16
(10) Тонкий кишечник (152)	4 075	2 756	2 772	2 923	2 862	1,1	0,7	0,7	0,7	0,7	1,5	1,0	1,0	1,1	1,1	-7,5
(11) Ободочная кишка (153)	14 442	15 282	16 939	17 428	17 715	3,8	3,9	4,2	4,2	4,2	5,4	5,7	6,2	6,3	6,4	4,3
(12) Прямая кишка, ректосигмоидное соединение, анус (154)	18 912	19 581	20 299	21 036	21 581	5,0	5,0	5,0	5,1	5,2	7,1	7,3	7,5	7,6	7,8	2,4
(13) Гортань (161)	7 086	7 410	7 650	8 066	8 457	1,9	1,9	1,9	2,0	2,0	2,7	2,8	2,8	2,9	3,0	2,7
(14) Трахея, бронхи, легкие (162)	71 466	74 444	78 371	81 054	84 137	18,8	19,0	19,4	19,7	20,1	26,7	27,6	28,8	29,5	30,4	3,3
(15) Кости и соединительная ткань (170)	5 130	5 348	5 577	5 810	5 701	1,3	1,4	1,4	1,4	1,4	1,9	2,0	2,0	2,1	2,0	1,3
(16) Кожа (172, 173)	3 623	3 828	4 163	4 118	4 316	1,0	1,0	1,0	1,0	1,0	1,4	1,4	1,5	1,5	1,6	3,4
(17) Молочная железа (174, 175)	20 781	21 861	22 292	23 291	24 251	5,5	5,6	5,5	5,7	5,8	7,8	8,1	8,2	8,5	8,7	2,8
(18) Шейка матки (180)	12 181	11 711	11 936	11 662	11 464	2,5	3,0	3,0	2,8	2,7	4,5	4,3	4,4	4,2	4,1	-2,3
(19) Другие злокачественные новообразования матки (184)	8 177	8 460	8 631	8 760	8 731	2,1	2,2	2,1	2,1	2,1	3,1	3,1	3,2	3,2	3,1	0,0
(20) Предстательная железа (185)	5 183	5 457	5 717	6 001	6 355	1,4	1,4	1,4	1,4	1,5	1,9	2,0	2,1	2,2	2,3	4,9
(21) Мочевые органы (188, 189)	13 739	14 406	14 835	15 479	16 145	3,6	3,7	3,7	3,8	3,9	5,1	5,3	5,4	5,6	5,8	3,3
(22) Лимфатическая и кроветворная ткань (200—208)	20 428	21 323	21 744	22 083	22 616	5,4	5,4	5,4	5,4	5,4	7,6	7,9	8,0	8,0	8,2	1,9
(23) в том числе лейкемии (204—208)	11 641	12 158	12 681	12 832	12 859	3,1	3,1	3,1	3,1	3,1	4,3	4,5	4,7	4,7	4,6	1,7
(24) Все злокачественные новообразования (140—208)	380 369	390 625	403 699	411 327	417 568	100,0	100,0	100,0	100,0	100,0	142,1	144,7	148,1	149,7	150,6	1,5

Key: 1. Table 10. Mortality rate due to malignant neoplasms among USSR population in 1981-1985—2. Absolute number of deaths—3. Structure of causes of death (in %)—4. Frequency per 100,000—5. Average annual rate of growth—6. Tumor site—7. Lip, oral cavity, throat (140-149)—8. Esophagus (150)—9. Stomach (151)—10. Small intestine (152)—11. Colon (153)—12. Rectum, rectosigmoid flexure, anus (154)—13. Pharynx (161)—14. Trachea, bronchi, lungs (162)—15. Bones and connective tissue (170)—16. Skin (172, 173)—17. Breast (174, 175)—18. Cervix (180)—19. Other malignant neoplasms of the cervix (184)—20. Prostate (185)—21. Uropoietic organs (188, 189)—22. Lymphatic and hemopoietic tissue (200-208)—23. Leukemia (204-208)—24. All malignant neoplasms (140-208)

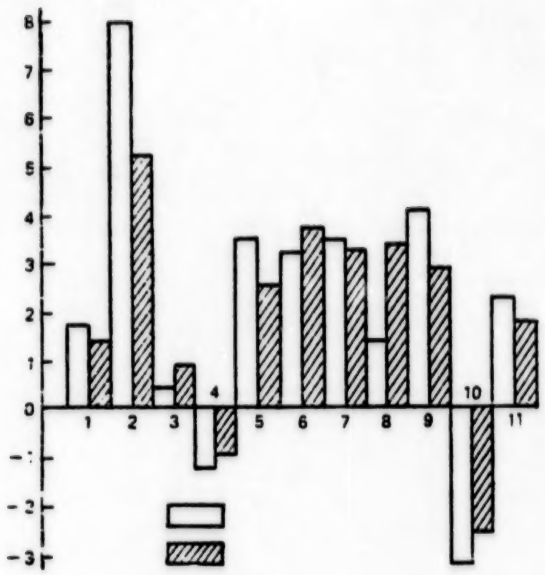


Figure 3. Average annual rate of growth of indices for morbidity and mortality due to malignant neoplasms among the USSR population in 1981-1985. Light columns represent morbidity; cross-hatched columns represent mortality. 1. Total—2. Oral cavity, throat—3. Esophagus—4. Stomach—5. Rectum—6. Pharynx—7. Lungs—8. Skin—9. Breast—10. Cervix—11. Lymphatic and hemopoietic tissue

3. Napalkov N. P., Merabishvili V. M., Tserkovnyy G. F., Preobrazhenskaya M. N. "Morbidity Rate of the USSR Population fro Malignant Neoplasms for the Period from 1970 Through 1980." VOPR. ONKOL., 1982, No 10, pp 26-71.

4. Zaridze D. G., Dvoirin V. V., Kobljakov V. A., Pisklov V. P. "Smoking Patterns in the USSR." In "Tobacco: A Major International Health Hazard." WHO, Lyon, 1986, pp 75-86.

Status of Pay Medical Cooperatives

18400196 Moscow ARGUMENTY I FAKTY in Russian No 2, 1989 p 4

[Article by G. Shvyrkov, candidate of economic sciences, V. Grishin, physician, economist: "Medical Cooperatives: the First Year"; subhead "Every Fourth Health Cooperative Is Short of Exercise Equipment"]

[Text] The opening of medical cooperatives has caused considerable controversy both among organizers of the service for the protection and improvement of health and in wide-ranging sectors of the general public. However, the absence of statistical data on a wide range of problems concerning the activity of these cooperatives is preventing an objective analysis of the phenomenon. But an opportunity to do so has appeared. In 1988, the USSR Academy of Sciences Institute of Economics and Forecast of Scientific and Technical Progress and the All-Union Scientific Research Institute of Social Hygiene, Economics and Health Care Management imeni N. A. Semashko conducted a study, the results of which we suggest our readers become familiar with.

The activity of 75 cooperatives operating in 60 cities of 9 union republics was analyzed, and individuals visiting 13 treatment-and-consultation, health-improvement, and medical-and-social cooperatives in Moscow were surveyed (the survey included more than 1400 persons).

The studies showed that the overwhelming majority of the cooperatives is situated in leased space. Some 6.4% of the cooperatives have their own space.

Difficulties in creating the material and technical base necessary for normal operation are precisely the basic causes impeding the development of cooperatives in the health care sector. A shortage of medical equipment and apparatus was noted in 69% of the cooperatives, and the absence of accomodations in 56%. More than 30% (we surveyed the directors of cooperatives) indicated the absence of procedural materials on setting up cooperatives and on the economic, juridical, and financial aspects of their operation.

Who Performs the Treatment?

A study of the regular staff of the cooperatives showed that physicians constitute the majority of those working in them (59%), while physicians make up only 21% of the staff of cost-accounting medical institutions, which also provide fee-based services to the public.

About 6% of the physicians working in the medical cooperatives are doctors of medical sciences, while 24% are candidates of medical sciences and 44% are physicians with a higher qualification category or a first qualification category.

According to the Coopertive Activity Cooperation Law, a person work in a cooperative in his free time or he may choose it as his primary place of employment. The study showed that 10% of the physicians working in cooperatives preferred them as their primary place of employment (in Moscow, that figure was 5%). The percentage of mid-level medical workers who work only in cooperatives was twice as high. This, in our opinion, indicates the beginning of a drain of medical workers into cooperatives.

The growth of the sector in health care with individual units and cooperative units has led to the fact that, at present, a new set of priorities is forming among highly skilled workers in their choice of work assignment. Work in a cooperative is the first choice. The second choice is work in an ITD [expansion not further identifed], and after that, in cost-accounting institutions. As physicians in private practice and those who work in cooperatives point out, primarily two factors affect these choices—

material incentive and the desire to develop one's professional capabilities more fully.

The study determined the percentage of funds that go to wages for cooperative workers. On average, 61% of the revenues go to wages. There is a big spread here: some cooperatives allocate only 30% of capital received for their services to the wage fund, while others allocate 85%. The latter include most often are newly set-up cooperatives.

The search for stable revenue sources compels cooperatives to seek new forms of services. That is why, in addition to performing services that are paid for directly by individual consumers, medical cooperatives actively seek to sign contracts with enterprises in which they provide the enterprises with services involving treatment and health improvement. More than 41% of the cooperatives do this type of work.

Who Is Treated?

Among those surveyed in the cooperatives, most were workers (73.5%). Pensioners made up 10%, and students, 4.8%.

The No. 1 reason that people seek paid medical care in cooperatives is, in the opinion of the patients, the better qualifications of the physicians (56.4%). Other reasons include the lack of appropriate medical specialists in rayon polyclinics (34.9%) and the more considerate attitude of cooperative medical personnel (33.9%).

Regrettably, in spite of the measures taken by the cooperatives, there is a problem with lines there, too (this was pointed out repeatedly by the visitors in their remarks).

The sociological study made it possible to single out the kinds of physicians visited most frequently and the most frequent types of treatment and diagnostic procedures performed:

—Gynecologist—14.6%

—Neuropathologist—7%

—Urologist—7%

—Stomatologist—6.7%

—Acupuncture—4.9%

—Physical therapy—4.5%

—Gastroenterologist—4.1%

—Psychotherapist—3.6%

—Exercise therapy—3.2%

—Massage—3.1%

—Iridodiagnosis—3.1%

—Surgeon—3.1%

—Cardiologist—2.5%

—Endocrinologist—2.5%

—Ophthalmologist—2.5%

—Anesthesiologist—2.4%

As seen from the table, there is no clear-cut leader among the services rendered in the medical cooperatives. However, if you consider the fee-based forms of medical assistance to be a unique indicator of the status of the state service for safeguarding and improving public health, this information may be used by health care organizers in making specific decisions concerning medical care planning.

A 'Painful' Question

Regardless of whether a patient received consultation, a course of therapy, or a diagnostic workup, 13.6% of the patients paid as much as 5 rubles for one visit to a cooperative; 28.6% paid as much as 10 rubles; nearly 27% paid as much as 15 rubles; 8.4% paid as much as 20 rubles. That is, almost 79% of those surveyed paid 20 rubles or less for one visit to a medical cooperative.

A visit cost as much as 30 rubles for 8.2% of those surveyed, while it cost as much as 50 rubles for 6.2% and 60 rubles for 0.8% In addition, 7.3% of the patients paid more than 60 rubles for one visit.

We must explain that among the services performed here are expensive forms of medical assistance—stomatology and prosthodontics, cosmetic surgery, termination of unplanned pregnancies, psychotherapy, speech therapy, and individual diagnostic workups.

Almost half of the patients reported that the cost of medical care in a medical cooperative was a strain on the family budget.

To the question of whether the medical and health-improving services provided by the cooperatives was thought to be satisfactory, some 48% of the respondents replied affirmatively; only 4.6% of those surveyed were dissatisfied with the organization and found the quality of the medical care provided to be unsuitable. The others had difficulty responding.

Some patients noted that the hours kept by the specialists are not always convenient and that medical personnel sometimes had an inconsiderate (!) attitude.

To the question of whether they would return to the cooperative if necessary, 62.7% of the respondents answered affirmatively, 34.6% were uncertain, and only 2.7% do not wish to return to a medical cooperative for services.

Conference on Plant Quarantine Held in Teheran

18400562 Moscow ZASHCHITA RASTENIY in Russian No 3, Mar 89 p 35

[Report on conference by V. N. Titayev and P. A. Melnik: "Soviet-Iranian Conference"]

[Text] The 35th Soviet-Iranian Conference on Plant Quarantine and Protection was held in Teheran in October 1988.

Reports on measures to control the Morocco locust and potato pests and diseases, especially bacterial and virus ones, in border regions of the USSR and Iran in 1988, on the plan for this work for 1989, and on the quarantine state of USSR and Iran territory were heard at meetings. Steps ensuring the observance of phytosanitary requirements placed on exported agricultural products and the system of quarantine control of the import, transportation, and use of imported seeds and planting stock were also discussed. The registration and tests of pesticides, integrated corn protection in the USSR, systems of cotton and rice protection against pests and diseases in Iran, and steps to control moths in orchards were also mentioned.

The parties considered it necessary to improve measures aimed at destroying quarantine organisms, including methods of decontaminating warehouse premises with products intended for export and of forecasting with the use of pheromone traps, as well as to ensure the observance of phytosanitary requirements during the transportation of agricultural freight. It was proposed to develop cooperation for increasing the efficiency of agricultural crop protection in the border regions of the two countries. An exchange of scientific and technical information and the organization of short-term periods of training specialists of both countries will contribute to the development and introduction of the biological method of controlling quarantine and other pests.

In 1988, owing to promptly taken measures, the herd form of the Morocco locust was not noted on USSR and Iran territory. Constant observations of the pest's habitats will continue.

In 1989 a joint Soviet-Iranian Commission will visit the border regions of the two countries for the purpose of studying the phytosanitary situation. The next 36th Conference on Plant Quarantine and Protection is to be held in Moscow in September of this year.

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